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MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: CARTER PA#: 23-019

Date: September 26, 1995 Time: 1330-1630

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Liebelt, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm (60°-70°F); breezy
(10-15 mph); frost in the morning.

Photographic Log (Photo No.'s/Video Tape Number): #15: Lower adit (AD-1
sample location) and highwall; #16: North side of WR-1 from north;
#17: South side of WR-1 from south (Note: Bank undercutting);
#18: WR-2 from above. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: Barrel on southeast
side of WR-1; 1/2 full of unknown liquid, bung hole is open and
barrel is laying on side.

General Comments on Potential Remedial Alternatives: Adit water
may require treatment. Remove waste rock dump from proximity of
discharge water or reroute water. Cover and revegetate waste rock
with proper amendments.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CARTER PA#: 23-019

Legal Description: T 15N ; R 9E ; Sec. 6 , SW 1/4 NW 1/4 1/4

County: JUDITH BASIN Mining District: HUGHESVILLE

Latitude: N 47° 05' 25" Longitude: W 110° 38' 36"

Primary Drainage Basin and Code: Dry Fork Belt Creek/10030105

Secondary Drainage Basin: Green Creek/Galena Creek

USGS Quadrangle map name(s): Barker

Mine Type/Commodities: Hardrock/Lead, Silver

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: 1/2 mile north of the Block P Mine

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown

General site features: Elevation 6220'-6280' , Slope 10°-20° ,
Aspect South

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 2 acre(s).

Site Dimensions: 550 feet x 225 feet

Predominant vegetation types: Spruces, Lodgepole pine, juniper, lupine

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites).
SW NW Sec. 6 Mine further up same road; on road past Hughesville which has numerous mines located along it.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is in Green Creek drainage. Green Creek flows southeast to confluence with Daisy Creek 1/4 mile downstream. They combine to form Galena Creek, which flows southwest to confluence with Dry Fork Belt Creek approximately 2.25 miles downstream. Dry Fork Belt Creek flows west. Site is underlain by limestone and porphyry.

Mining/milling history, ore type/tenor, host rock, gangue: Main deposit occurred at the contact of limestone and porphyry as a pipe shaped body. This deposit contained galena 10 feet wide to a depth of 120 feet; within 100 feet it widened to 30 feet, but was at lower grade and contained much iron pyrite and a little chalcopyrite and only 5 to 6 oz. silver a ton. Some ore was shipped to Swansea, Wales, and some to Hughesville and Glendennin for smelting.

Mine Operation?

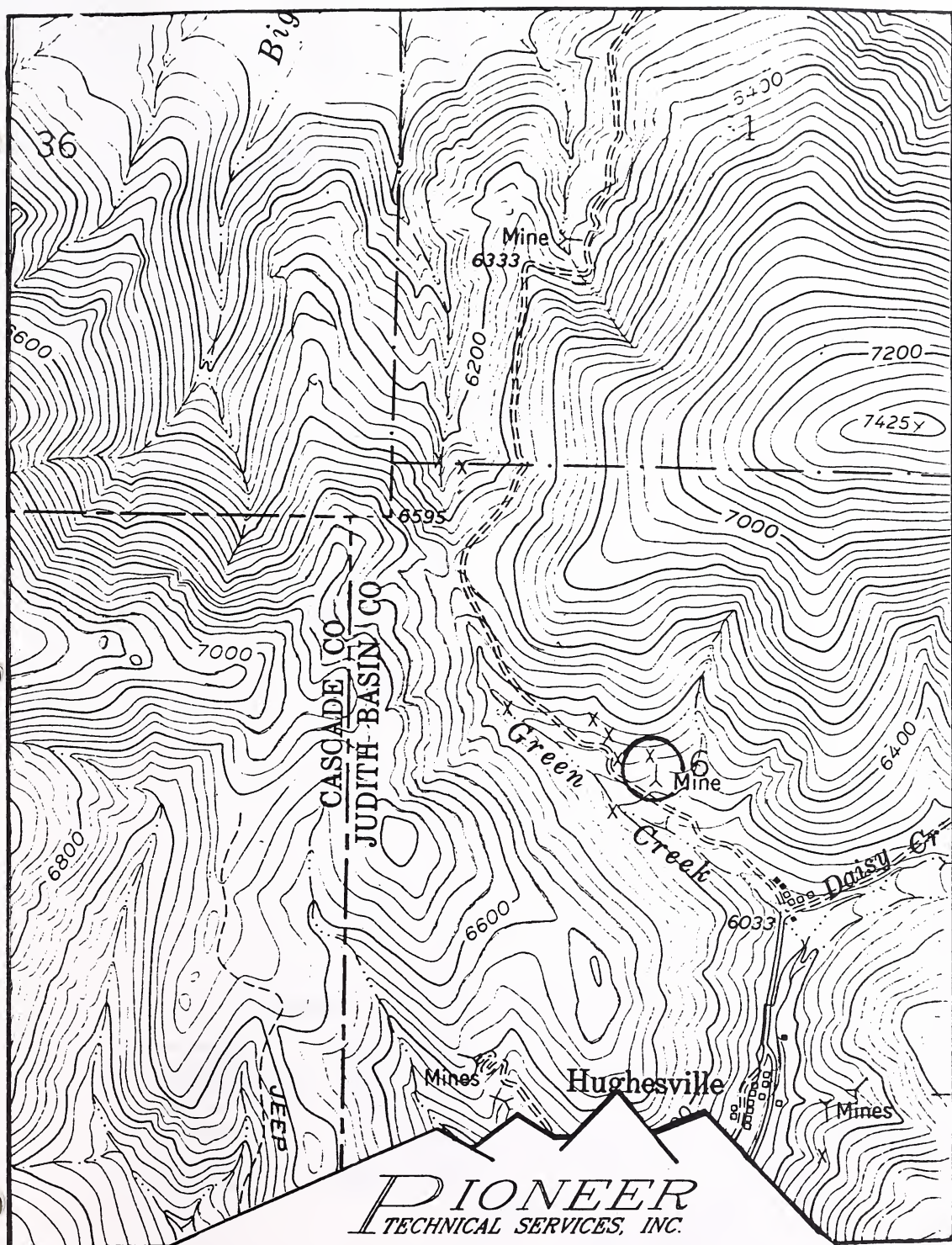
Shafts - Yes X, No , # 1, Comment Collapsed to pit 20' deep
Adits - Yes X, No , # 1, Comment Open, 1x1, 1x2 holes
Pits - Yes , No , # , Comment
Placers - Yes , No , # , Comment
Other - Yes , No , # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A

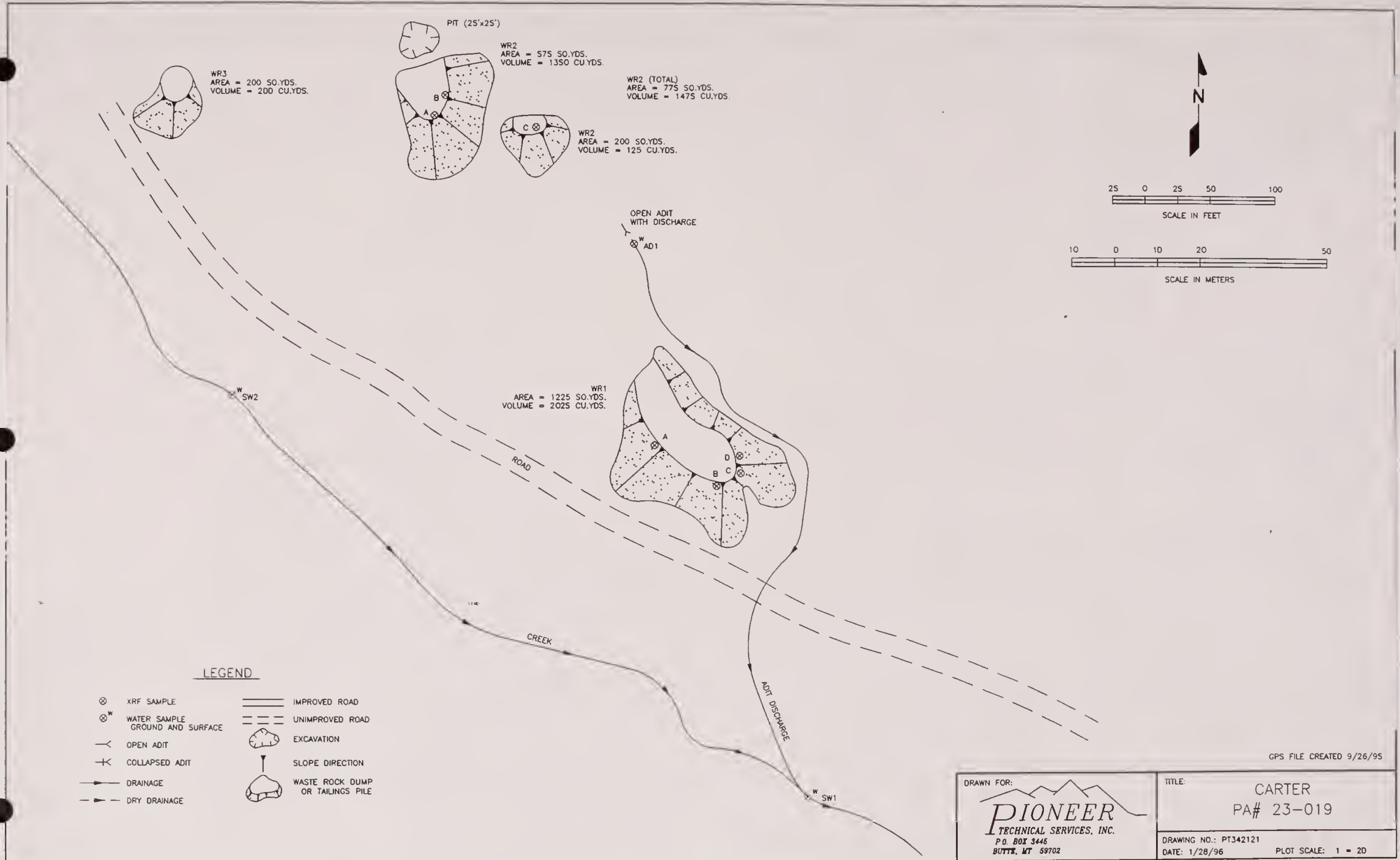


PIONEER
TECHNICAL SERVICES, INC.

CARTER, P.A. NO. 23-019

T15N. R09E. SECTION 06

SCALE 1" = 1000'



DRAWN FOR:

PIONEER

TECHNICAL SERVICES, INC.

P.O. BOX 3446

BUTTE, MT 59702

TITLE:

CARTER

PA# 23-019

DRAWING NO.: PT342121

DATE: 1/28/96

PLOT SCALE: 1" = 20'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Liebelt

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	PH SU (D/S)*	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	2,025	Lower dump; north portion, west face, on top	None	< 3.5	0.05	23-019-WR-1	09/27/95 1000	T-Metals, ABA
WR-1B	WR		Lower dump; lobe south of WR- 1A, west face, on top	None	4.5	0.03			
WR-1C	WR		Lower dump; east lobe, west face, near top	None	5.6	0.06			
WR-2A	WR	1,350	Upper dump; south end, near top	None	< 3.5	0.055	23-019-WR-2	09/27/95 1000	T-Metals, ABA
WR-2B	WR		Upper dump; east side, near top	None	4.2	0.05			
WR-2C	WR	125	Upper dump, lower level; southeast end, midway down	None	< 3.5	0.075			

* pH readings were taken directly on-site (Palmer Meter).

Comments or deviations from SOPs: 23-019-WR-1 is a composite of WR-1A through -1C. 23-019-WR-2 is a composite of WR-2A through -2C. Background sample was collected at the Tiger Mine (23-059-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-
associated with WR-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes , No X;

Number of well logs:

Distance to nearest well used for drinking:

 < 1,000 ft; 1,000 ft to 0.5 miles; X > 0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Uncontained sources with elevated metals; shallow groundwater near lower
dump.

Approximate Depth to Groundwater: X < 25 ft; 25 - 100 ft; > 100 ft.

Other observations/notes: Adit appeared to be almost full of water;
caved area reached to within one foot of top of adit portal. Water is
flowing out of this opening. Portal has metal gate almost completely
covered by the cave-in. Side of portal had been bricked and water had
broken through it and was also flowing out there. Yellowish looking
sludge in water in adit. Water flowing out was clear, but adit
discharge channel stained red with algae.

SAMPLERS: Flammanq, Liebelt

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, sheet, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Green Creek

Dry streambeds: Yes____, No X, Name(s):_____

Other surface water: Yes X, No , Name(s)/Description: Adit
discharge

Waste materials within any floodplain: Yes____, No X Source ID(s):__

Approximate Flood frequency? 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; adit discharge flows over and on east side of WR-1. 75-100 feet between base of WR-1 and Green Creek.

Surface water draining onto or through waste sources: Yes X, No ,
Describe: See above

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Agriculture, recreation, wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): _____

SAMPLERS: Flammang, Liebelt

[illegible]

WOM: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₂)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 to 2 acres below WR-1

Wetlands present: Yes____, No X, Describe: _____

Carbonate rocks/soils: Yes X, No____, Describe: _____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10____; 10-30 X; 30-100____;
100-300____; 300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or
greater____; Comments Town of Barker

Nearest residence: ____ <1,000 ft; ____ 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Flammang, Liebelt

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FeOx; pH; minor SO ₃	Partial	11,025	10,805	Yes	Low
WR-2A, -2B	pH; FeOx; minor SO ₃	Dry	5,175	2,588	Yes	Low
WR-2C	pH; SO ₃ ; FeOx; copper-staining	Dry	1,800	900	Yes	Low
WR-3	FeOx	Dry	1,800	1,800	Yes	Low
AD-1	FeOx; algae; yellow sludge	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications: WR-3 was not sampled, GPSed for volumes only; a hole had been dug in the middle of WR-3 and material removed.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe:_____
Pop cans

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes X, No____, Comment Open adit

Primary Drainage____; Secondary Drainage X; No Information____:
Riparian Habitat Quality - High____, Medium X, Low____
Wetlands Frontage - High____, Medium____, Low X
Fisheries Habitat and Species Classification - 6
Sport Fishery Classification - 6

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
AD-1 has 1x1 and 1x2 openings with bars.

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Highwall associated with AD-1, 10' tall, soil on
top overhangs and is caving.

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 2, types and locations: WR-1 on adit discharge side is
oversteepened and caving. WR-2 is steep, at angle of repose, and 25'
long.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Mineral Industry File 90.0, Carter Mine, Barker Mining District.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Portal Inventory Form for Carter Mine, Prepared by Daphne Digrindakis, June 12, 1985.

USBM, Mineral Industry Survey, Information Circular 7602, 1946.

USGS, Topographic Map, Barker, Montana, 7 1/2 minute Quadrangle, 1961.

LABORATORY ANALYTICAL DATA

CARTER

PA NO. 23-019

Carter Mine PA# 23-019
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE:

		SOLID MATRIX ANALYSES															
		Metals in soils Results per dry weight basis															
FIELD ID	SB (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Ca (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)	CYANIDE (mg/kg)
23-019-SE-1	6.0 UJ	38.7	67.7 J	2.9 J	6890	1.9 U	3.9	163 JX	22700	70.1	3980	638	0.049 U	4.0	0.9 U	442	NR
23-019-SE-2	10.2 UJ	34.7	102 J	3.0 J	32400	4.9	7.3	48.8 JX	20400	97.2	15900	513	0.069 U	11.3	1.5 U	696	NR
23-019-WR-1	5.4 UJ	214	97.4 J	1.5 J	51900	1.7 U	5.7	135 JX	30000	1840	31100	2270	0.32	9.7	22.9	287	NR
23-019-WR-2	6.8 UJ	205	46.6 J	6.7 J	23800	2.1 U	2.4 U	564 JX	121000	2050	6180	180	0.15	3.1 U	12.0	228	NR
BACKGROUND	3.98 UJ	5.1 J	159 J	1 U	NR	8.09 J	3.83	9.81 J	13300	61.4	NR	548	0.02772	7.93	NR	130	NR
U: Not Detected, J: Estimated Quantity, X: Outlier for Accuracy or Precision, NR: Not Requested																	
		Acid/Base Accounting															
		Total				Pyritic Sulfur				Pyritic Sulfur				Line Req. Dolphof (mg/kg)			
FIELD ID	TOTAL SULFUR %	Sulfur	Acid Base Potential	Sulfur	Sulfur %	Pyritic Sulfur %	Organic Sulfur %	Pyritic Sulfur	Acid Base Potential	Pyritic Sulfur	Acid Base Potential	Line Req. Sulfur (mg/kg)	Potential Acidity	Line Req. Dolphof (mg/kg)	Line Req. Dolphof (mg/kg)	Line Req. Dolphof (mg/kg)	Line Req. Dolphof (mg/kg)
23-019-WR-1	0.72	22.5	184	162	0.15	0.24	0.33	7.50	177.00	177.00	-9.38	371.70	21.33	203.34	427.01	-166.52	-166.52
23-019-WR-2	3.21	100	20.9	-79.3	1.07	0.37	1.77	11.6	-9.38	177.00	-9.38	-19.70	91.96	-88.82			

		WATER MATRIX ANALYSES															
		Metals in Water Results in µg/l															
FIELD ID	SB (µg/l)	As (µg/l)	Ba (µg/l)	Cd (µg/l)	Ca (µg/l)	Cr (µg/l)	Co (µg/l)	Cu (µg/l)	Fe (µg/l)	Pb (µg/l)	Mg (µg/l)	Mn (µg/l)	Hg (µg/l)	Ni (µg/l)	Ag (µg/l)	Zn (µg/l)	HARDNESS (mg CaCO ₃ /l)
23-019-SW-1	2.7 U	6.9	27.8	0.16	45600	9.6 U	10.9 U	4.4 U	518	2.9 JX	18200	113 J	0.16 U	13.9 U	0.21 UJX	93.8	189
23-019-SW-2	2.7 U	2.5	38.6	0.064 UJ	52800	9.6 U	10.9 U	4.4 UJ	136	1.4 J	14800	40.5	0.18 U	13.9 U	0.21 U	11.0 J	193
23-019-AD-1	2.7 U	14.9	6.6	0.064 UJ	39700	9.6 U	10.9 U	8.3 J	1410	1.2 J	20800	205	0.16 U	13.9 U	1.1	86.8 J	185
U: Not Detected, J: Estimated Quantity, X: Outlier for Accuracy or Precision, NR: Not Requested																	
		Wet Chemistry Results in mg/l															
		Total				Dissolved				Solids				CYANIDE			
FIELD ID	CHLORIDE	SULFATE	NO ₃ /NO ₂ -N	NO ₃ /NO ₂ -N	CHLORIDE	SULFATE	NO ₃ /NO ₂ -N	NO ₃ /NO ₂ -N	CHLORIDE	SULFATE	NO ₃ /NO ₂ -N	NO ₃ /NO ₂ -N	CHLORIDE	SULFATE	NO ₃ /NO ₂ -N	NO ₃ /NO ₂ -N	CHLORIDE
23-019-SW-1	198	< 5	46	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
23-019-SW-2	184.0	< 5	27.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
23-019-AD-1	168.0	< 5	42	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Legend

SE-1: 6' downstream of adit discharge confluence with Green Creek.
 SE-2: 260' upstream of WR1 north side.
 WR-1: Composite of WR1A, WR1B, WR1C.
 WR-2: Composite of WR2A, WR2B, WR2C.
 BACKGROUND: From the Tiger Mine (23-059-SS1) (1983 data).
 AD-1: Taken at adit portal.
 SW-1: Same as SE-1.
 SW-2: Same as SE-2.

XRF ANALYSIS RESULTS

**CARTER
PA NO. 23-019**

Mine Name: Carter PA No. 23-019
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
23-019-WR1A	142.28	9741.2	1526.5	364.71 *		270.18 *	979.63 *	141896	1954.4 *	716.61	240.42 *	700.69 *	
23-019-WR1B	95.175	128443	128443				8275.9	20917			531.91	46.403 *	
23-019-WR1C	221.54	18679	6025.9	742.64 *			22191	405.14 *			71.273 *		
23-019-WR2A	96.716	5364.4	11165	1191.6			881.85 *	145789	1911.7 *	138.63 *	290.26 *	155.77 *	
23-019-WR2A-DUP	103.41	5911.3	11921	1165.8			1008.8 *	146862	2624.1 *	250.49 *	315.32 *	145.5 *	
23-019-WR2B	58.865	7953.2	22681	1127.6				133184	2048.3 *	627.57	313.18 *		
23-019-WR2C	43.139 *	4715.6	31619		250.53 *			137019	1573.3 *	788.86	204.99 *	168.05 *	
23-019-WR2C-SDUP	91.432	6054.9	41296					155967	1238.2 *	718.8	153.85 *	123.36 *	
23-019-WR2C-DUP	80.302	6839.2	42884					153885	1621.2 *	781.44	191.73 *	169.41 *	
23-019-WR1-COMP	159.26	6220	62454	333.76 *			3715.6	58520		180.2 *	230.87	191.24 *	
23-019-WR2-COMP	78.578	5549.3	31368	378.54 *			603.22 *	147822	1856 *	642.5	239.18 *		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
23-019-WR1A	142.28	111.91	12.191 *		3745.1	151.93				1205.2	231.95 *		
23-019-WR1B	95.175	22.945	9.1732 *		26.635 *						99.905 *		
23-019-WR1C	221.54	163.84			227.84	190.78				1200.6		20.6 *	
23-019-WR2A	96.716	270.82	97.487		108.85 *	58.838 *				472.94	169.96 *	33.757 *	
23-019-WR2A-DUP	103.41	264.92	101.05		107.83 *	56.744 *				490.26	194.93 *	31.123 *	
23-019-WR2B	58.865	197.56	10.856 *		2963	79.347 *				270.49	149.22 *	23.534 *	
23-019-WR2C	43.139 *	68.463	48.802		627.76	54.088 *				198.88	316.48	19.166 *	
23-019-WR2C-SDUP	91.432	89.832	49.127		770.52	99.455 *				306.01	137.11 *	28.91 *	
23-019-WR2C-DUP	80.302	90.855	44.548		775.01	89.812 *				886.9	158.18 *	35.925	
23-019-WR1-COMP	159.26	89.834	9.8303 *		1154.6	139.34				337.05	128.5	15.876 *	
23-019-WR2-COMP	78.578	178.96	32.812 *		1459	97.45 *					220.43 *	16.213 *	



**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**CARTER
PA NO. 23-019**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

CARTER
23-019

LINE NO.				
GROUNDWATER PATHWAY				
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	7.934
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		0
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	0.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9	0
SURFACE WATER PATHWAY				
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		300
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE *	LINES 11 + 12 + 13C	700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	9.594
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		0
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	17
24		SURFACE WATER SCORE	LINES 14 x 15 x 23	114169
AIR PATHWAY				
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		10
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.244
29	AIR - TARGETS	POPULATION - 4 MILES		10
30		NEAREST RESIDENCE		0
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	10
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34	122
DIRECT CONTACT PATHWAY				
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		50
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.221
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		5
43		TARGETS SCORE	SUM LINES 40 THRU 42	6
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	199
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE			1.14
	(LINES 10 + 24 + 35 + 44) / 100,000			

LINE
NO.

SITE NAME:
PA NUMBER:

CARTER
23-019

SITE SAFETY			
1	THREAT	ACCESSIBILITY	20
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	75
5		HAZ. STRUCTURES 40 EA.	40
6		EXPLOSIVE HAZARD	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	165
9		POPULATION - 1 MILE	1
10	TARGETS	NEAREST RESIDENCE	0
11		RECREATIONAL USE	5
12		TARGETS SCORE SUM LINES 9 THRU 11	6
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	19.80



MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: M.T.A. PA#: 23-040

Date: September 26, 1995 Time: 1700-1900

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Liebelt, Pioneer

Visitors: None

Weather/Seasonality Observations: Cool; sunny; clear.

Photographic Log (Photo No.'s/Video Tape Number): #20: WR-1 from below on WR-2; #21: WR-2 from below on WR-3; #22: Adit at WR-3; #23: South part of WR-3 from below on road (north); #24: WR-4 from road below (west); #25: WR-5 from road above (east); #26: Open adit at WR-5 along road. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is also identified as Queen Tunnel or Queen of the Hills by Ms. Gwen McBride, owner.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Close HMOs. Cover, amend, and revegetate waste rock dumps with proper amendments. Provide for drainage through steep valley.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): M.T.A. PA#: 23-040

Legal Description: T 15N ; R 9E ; Sec. 7 , NW 1/4 NE 1/4 1/4

County: JUDITH BASIN Mining District: HUGHESVILLE

Latitude: N 47° 04' 55" Longitude: W 110° 37' 47"

Primary Drainage Basin and Code: Dry Fork Belt Creek/10030105

Secondary Drainage Basin: Galena Creek

USGS Quadrangle map name(s): Barker

Mine Type/Commodities: Hardrock/Silver-lead

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Gwen McBride,
P.O. Box 905, Monarch, Montana 59463.

Relationship to other mines/sites in the area/district: Across
Galena Creek from Block P; north of Liberty Mine

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown

General site features: Elevation 5880'-6000' , Slope 30° ,
Aspect West

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 1.2 acre(s).

Site Dimensions: 350 feet x 150 feet

Predominant vegetation types: Lodgepole pine, fir

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd , trail X .

Other logistical considerations (proximity to other sites). Within
Hughesville area (Block P, Marcelline)

Well logs within 1 mile radius; (Attach MRMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Site lies on east side and approximately
500 feet above Galena Creek. Water leaving the site would flow
west to Galena Creek, then south in Galena Creek approximately 2
miles to confluence with Dry Fork Belt Creek, which flows west.
Site is underlain by Hughesville porphyry.

Mining/milling history, ore type/tenor, host rock, gangue: Vein
mineralization consisting of pyrite, sphalerite, argentiferous
galena within a gangue of quartz, barite, and rhodochrosite within
the Hughesville porphyry. Mine is an off-shoot of Block P vein.

Mine Operation?

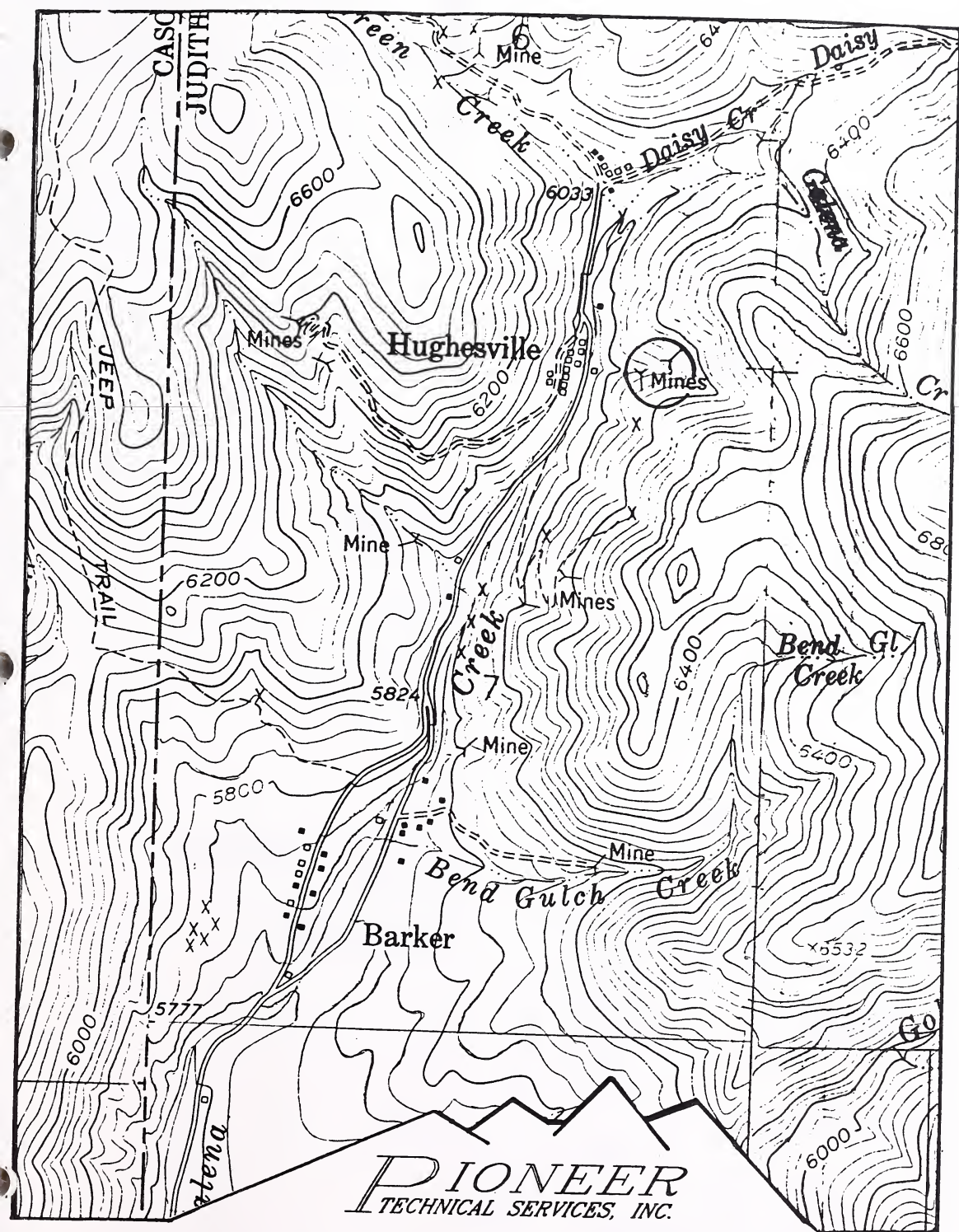
Shafts - Yes X, No , # 1, Comment Caved up top
Adits - Yes X, No , # 4, Comment 2 open; 2 collapsed
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

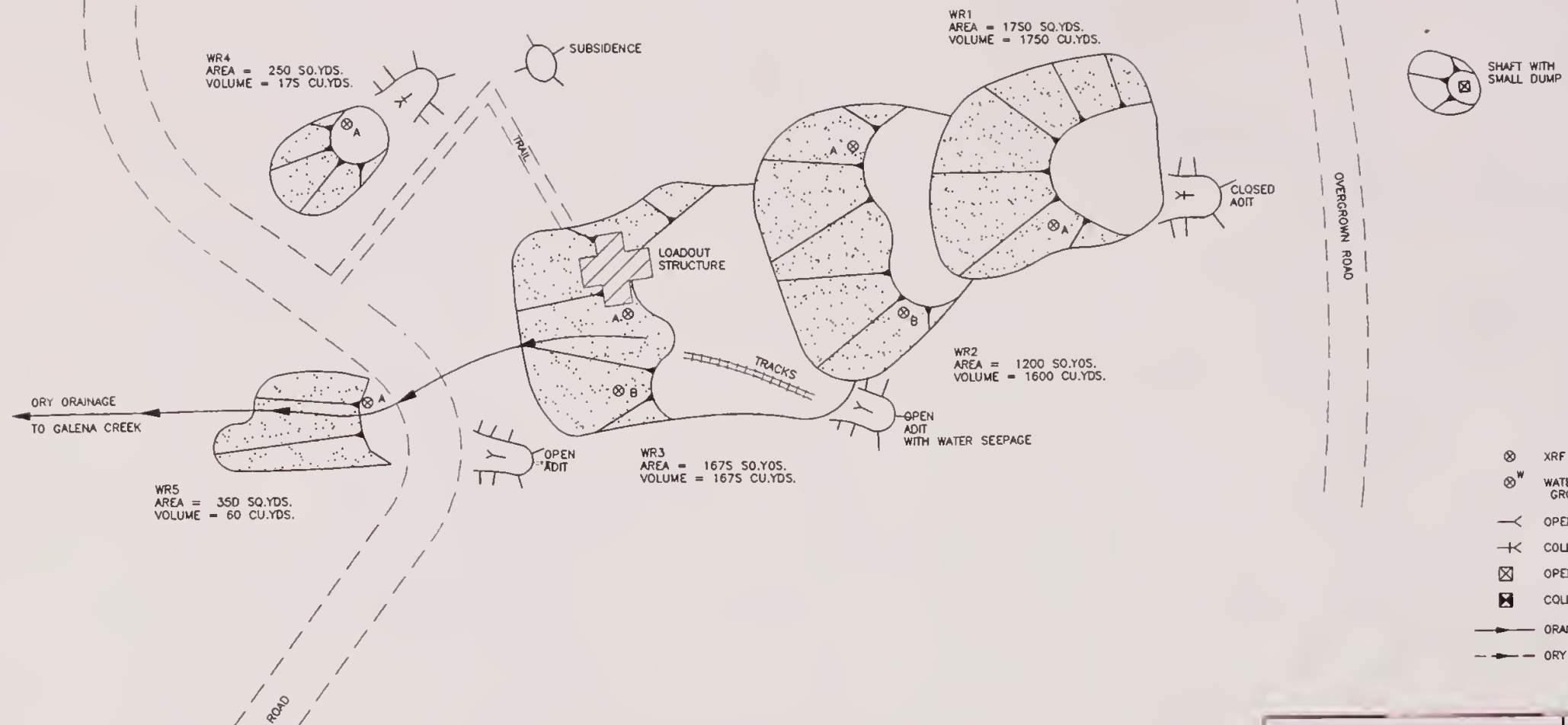
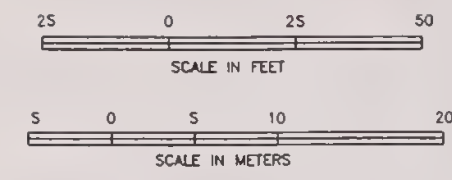


PIONEER
TECHNICAL SERVICES, INC.

M.T.A., P.A. NO. 23-040

T15N, R09E, SECTION 07

SCALE: 1" = 1000'



LEGEND

- | | | | |
|----------------|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | ===== | IMPROVED ROAD |
| ⊗ ^W | WATER SAMPLE GROUND AND SURFACE | ----- | UNIMPROVED ROAD |
| — | OPEN ADIT | ▨ | STRUCTURE |
| — | COLLAPSED ADIT | ⬮ | SUBSIDENCE |
| ⊠ | OPEN SHAFT | ⬮ | SLOPE DIRECTION |
| ⊠ | COLLAPSED SHAFT | ⬮ | WASTE ROCK OUMP OR TAILINGS PILE |
| → | ORAINAGE | | |
| - - - | DRY ORAINAGE | | |

GPS FILE CREATED 9/26/95

DRAWN FOR: PIONEER TECHNICAL SERVICES, INC. P.O. BOX 3445 BUTTE, MT 59702	TITLE: M.T.A. PA# 23-040
	DRAWING NO.: PT342125 DATE: 3/5/96 PLOT SCALE: 1 = 10

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Liebelt

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	PH SU (D/S)*	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1	WR		Upper dump; east	None	6.0	0.05	23-040-WR-1	09/27/95 1000	T-Metals, ABA
WR-2A	WR		Middle dump; north part	None	5.0	0.05			
WR-2B	WR		Middle dump; south side	None	4.0	0.06			
WR-3A	WR		Lower dump above road; north end	None	< 3.5	0.05			
WR-3B	WR		Lower dump above road, south end	None	< 3.5	0.06			
WR-4	WR		Small dump (north) above road	None	6.1	0.06	N/A	N/A	XRF Analysis
WR-5	WR		Small dump (west) below road	None	3.7	0.06	N/A	N/A	XRF Analysis

* pH readings were taken directly on-site (Kelley Meter).

Comments or deviations from SOPs: 23-040-WR-1 is a composite of WR-1A, -2A, -2B, -3A, and -3B (upper workings).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X, Number:____ Identification:_____

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes____, No X;

Number of well logs:_____

Distance to nearest well used for drinking:

____<1,000 ft;____1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable____, Possible X, Unlikely____.

Deeper groundwater and up on steep hillside

Approximate Depth to Groundwater:____<25 ft; X 25 - 100 ft;____ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes X, No____, Name(s): Unnamed tributary of Galena Creek

Other surface water: Yes____, No X, Name(s)/Description: _____

Waste materials within any floodplain: Yes____, No X Source ID(s): _____

Approximate Flood frequency? ____1 yr, ____10 yr, ____100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)? > 100 feet

Surface water draining onto or through waste sources: Yes____, No X, Describe: _____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Dry Fork Belt Creek has wetlands, agriculture (stock watering, fishery above confluence with Galena Creek; Dry Fork Belt Creek is reported to contain Cutthroat Trout, which is a sensitive species).

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): _____

SAMPLERS:

[illegible]

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? None

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes X, No___, Describe: Limestone in area

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments Town of Barker (5 year round, several seasonal)

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Liebelt

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FeOx	Dry	15,750	15,750	Yes	Moderate
WR-2	FeOx; pH	Dry	10,800	10,800	Yes	Moderate
WR-3	FeOx; pH	Dry	15,075	15,075	Yes	Low
WR-4	SO ₃ ; FeOx	Dry	2,250	2,250	Yes	Low
WR-5	FeOx; pH	Dry	3,150	3,150	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10____; 10-30 X; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Increases during summer months

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____Moderately Accessible - barbed wire fences,
road gated, or signs posted;____Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes X, No____, Comment Possible open adits

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____
Wetlands Frontage - High____, Medium____, Low X
Fisheries Habitat and Species Classification - 6
Sport Fishery Classification - 6

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 2, types and locations:____
Open adits at WR-3 and WR-5

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Loadout at WR-3

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for M.T.A., Prepared by Chen-Northern, August 31, 1989.

USGS, Topographic Map, Barker, Montana, 7 1/2 minute Quadrangle, 1961.

LABORATORY ANALYTICAL DATA

M.T.A.

PA NO. 23-040

M.T.A. PA# 23-040
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/26/95

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
23-040-WR-1	14.8 J	744	641 J	9.5 J	289	1.7 U	2.0 U	66.7 JX	32100	11900	441	79.0	3.0	2.5 U	40.6	1640	NR
BACKGROUND	3.98 UJ	5.1 J	159 J	1 U	NR	8.09 J	3.83	9.81 J	13300	61.4	NR	548	0.02772	7.93	NR	130	NR
Acid/Base Accounting																	
	TOTAL SULFUR %	Total Sulfur Acid Base Potential U/10000	Neutral Potential U/10000	Tot. Sulfur Acid Base Potential U/10000	Sulfate Sulfur %	Pyritic Sulfur %	Organic Sulfur %	Pyritic Sulfur Acid Base Potential U/10000	Pyritic Sulfur Acid Base Potential U/10000	Lime Req. Sobek (lbs.) 1ft	Lime Req. Sobek (lbs.) 1ft	Potential Acidity	Lime Req. Dolphoff (lbs.) 1ft	Lime Req. Dolphoff (lbs.) 1ft			
23-040-WR-1	1.22	38.1	-4.70	-42.8	1.04	0.06	0.12	1.87	-6.58	-6.58	-13.82	30.00	-43.38	-91.09			

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy of Precision, NR- Not Requested

Legend

WR-1, WR1A, 2A, 2B, 3A, 3B
BACKGROUND- From the Tiger Mine (23-059-SS1) (1993 data).

XRF ANALYSIS RESULTS

M.T.A.

PA NO. 23-040

Mine Name: M.T.A. PA No. 23-040

XRF SAMPLE I.D.	CrH	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Ba	Ag	Zn	As	Se
23-040-WR1A		29253	2385.4	2596.1				41790				845.34		
23-040-WR2A		32719	2031.1	2918.4		610.33 *			539.24 *			1146.9		
23-040-WR2B		27688	3870.3	3277.8				37351	539.3 *			1587.6		669.44
23-040-WR3A		33239	2587.8	1685.2				57881	854.8 *			183.25 *		
23-040-WR3B		34970	1748.1	2862.5				38493	719.62 *			3099.4		
23-040-WR4		27865	3131.7	1940.5				40568				234.72		
23-040-WR5		42307	2322.1	1950.3				20687	683.37 *			228.59		
23-040-WR1-COMP		26863	2761.1	2380.6		474.01 *		38252			72.001 *	1199.2		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb				U	Th
23-040-WR1A	745.8	292.96		4667.7			231.68				3395	131.58 *	20.656 *	20.344 *
23-040-WR2A	508.18	291.5		2762.2			315.63				2629.8	102.69 *	35.996 *	31.677 *
23-040-WR2B	397.33	313.51		4949.7		178.25					1919.2	213.63 *	30.052 *	24.008 *
23-040-WR3A	553.53	245.63		18459		183.43		271.03 *	110.56 *		6309.4	404.95 *	23.947 *	
23-040-WR3B	624.53	263.91		8238		235.07					1650.6	227.89 *	35.106 *	
23-040-WR4	388.02	321.14		3004.5		268.14					1890.8	153.47 *	24.297 *	41.923 *
23-040-WR5	361.3	311.39		1411.6		345.35					2679.2	105.31 *	26.792 *	34.411 *
23-040-WR1-COMP	571.08	300.55		6580.4		244.99					2463.5	201.07 *	33.987 *	38.249 *

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**M.T.A.
PA NO. 23-040**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

M.T.A
23-040

LINE NO.				
GROUNDWATER PATHWAY				
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD	CONTAINMENT		20
3B	OF RELEASE	GW DEPTH		10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	39.251
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		0
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	0.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9	0
SURFACE WATER PATHWAY				
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD	EXCEEDENCES		0
13A	OF RELEASE	CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	42.879
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19	SW - TARGETS	FISHERY		0
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	17
24		SURFACE WATER SCORE	LINES 14 x 15 x 23	29158
AIR PATHWAY				
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD	CONTAINMENT		15
26B	OF RELEASE	DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	150
27		LIKELIHOOD SCORE	LINES 25 + 26C	150
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.429
29		POPULATION - 4 MILES		10
30		NEAREST RESIDENCE		5
31	AIR - TARGETS	WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	15
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34	3215
DIRECT CONTACT PATHWAY				
36		OBSERVED EXPOSURE		0
37A	LIKELIHOOD OF	ACCESSIBILITY		20
37B	EXPOSURE	DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	200
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.308
40	DIRECT CONTACT	POPULATION - 1 MILE		10
41	TARGETS	NEAREST RESIDENCE		5
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	15
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	3924
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE			0.36
	(LINES 10 + 24 + 35 + 44) / 100,000			

LINE NO.	SITE NAME: PA NUMBER:		M.T.A 23-040
	SITE SAFETY		
1	THREAT	ACCESSIBILITY	20
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	100
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	0
5		HAZ. STRUCTURES 40 EA.	40
6		EXPLOSIVE HAZARD	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	140
9		POPULATION - 1 MILE	10
10	TARGETS	NEAREST RESIDENCE	5
11		RECREATIONAL USE	0
12		TARGETS SCORE SUM LINES 9 THRU 11	15
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	42.00



23-040, #20: WR-1 from below



23-040, #23: South end of WR-1 from below on



23-040, #20: WR-1 from below on WR-2



23-040, #21: WR-1 from below on WR-2



23-040, #25: WR-5 from road above (east)



23-040, #24: WR-4 from road below (west)



23-040, #26: Opel adit at WR-5 along road

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: BELFONT PA#: 23-060

Date: September 26, 1995 Time: 0930-1100

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Liebelt, Pioneer

Visitors: None

Weather/Seasonality Observations: Cold; clear; sunny; calm.

Photographic Log (Photo No.'s/Video Tape Number): #6: One collapsed adit and one gated adit; #7: West side of WR-1 (dozed up); #8: WR-1 from adit (Daisy Creek in background); #9: North end of WR-2 from road; #10: West end of WR-2 from south. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Mine recently had exploration activity (1989).

Other Hazardous Materials/Substances Present: None observed, but shed on-site was locked.

General Comments on Potential Remedial Alternatives: Remove or isolate waste rock dumps from stream; cover, amend, and revegetate dumps.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): BELFONT PA#: 23-060

Legal Description: T 15N ; R 9E ; Sec. 6 , NE 1/4 SE 1/4 1/4

County: JUDITH BASIN Mining District: HUGHESVILLE

Latitude: N 47° 05' 18" Longitude: W 110° 37' 32"

Primary Drainage Basin and Code: Dry Fork Belt Creek/10030105

Secondary Drainage Basin: Daisy Creek/Galena Creek

USGS Quadrangle map name(s): Barker

Mine Type/Commodities: Hardrock/Silver, Lead

Activity Status: Active, Inactive/Exploration X, Abandoned.

Ownership status: Known Y X N; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Developed by the same company (Moulton Consolidated Mining) as Moulton, Harrison, Pioneer, Tiger, and T.W. Lodes.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Hughesville District is listed under CECRA.

General site features: Elevation 6120', Slope 15°,
Aspect West

Land use: Mining X, Recreational X, Residential, Urban,
Agricultural, Other(Specify)

Area of disturbed/unvegetated lands? 1.2 acres acre(s).

Site Dimensions: 200 feet x 250 feet

Predominant vegetation types: Lodgepole pine, aspen, alder, fir

Access: roads - good (paved), poor (maintained dirt road),
4wd X, trail.

Other logistical considerations (proximity to other sites). Road locked with cable 1/4 mile below (west) of site.

Well logs within 1 mile radius; (Attach MRMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (also
note presence of radioactive minerals). Mine in Daisy Creek drainage flows
southwest 0.25 mile to confluence with Galena Creek, which flows
south 2.5 miles to confluence with Dry Fork Belt Creek. Dry Fork
Belt Creek flows west away from confluence.

Mining/milling history, ore type/tenor, host rock, gangue: No
information was found.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment_____

Adits - Yes X, No___, # 2, Comment 1 caved; 1 open with door
and discharge

Pits - Yes___, No X, # ____, Comment_____

Placers - Yes___, No X, # ____, Comment_____

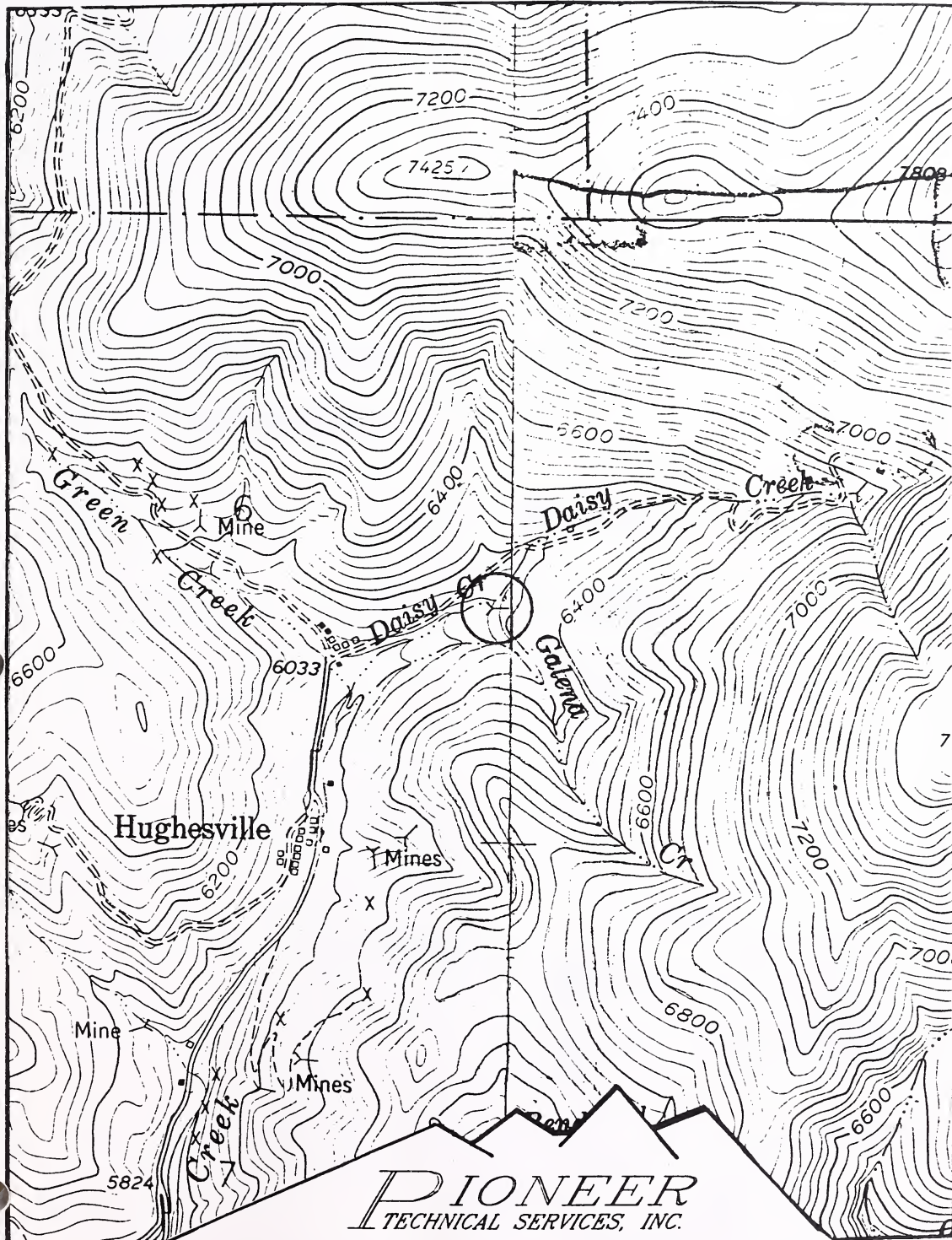
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes___, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A



PIONEER
TECHNICAL SERVICES, INC.

BELFONT, P.A. NO. 23-060

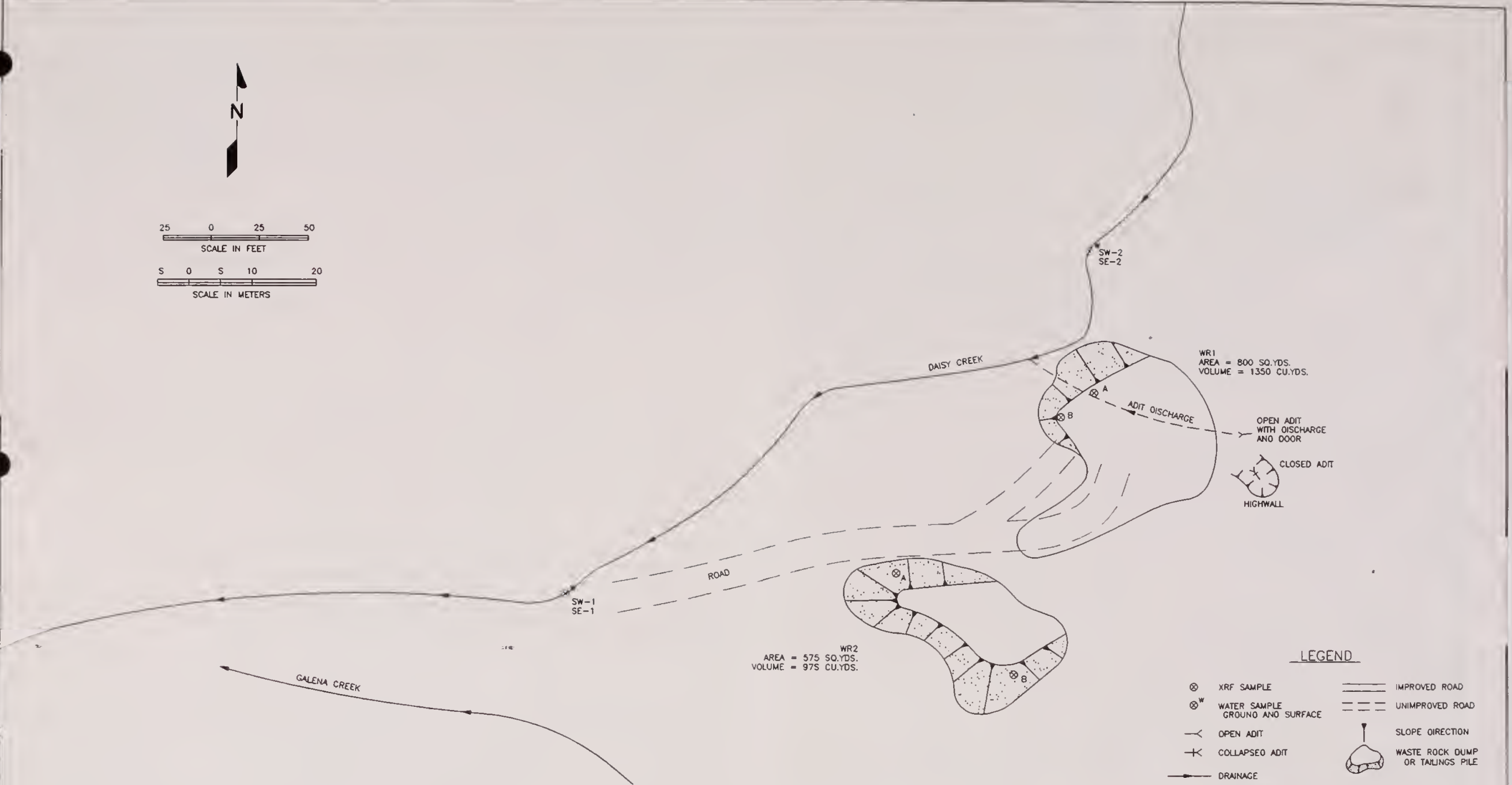
T15N, R09E, SECTION 06

SCALE: 1" = 1000'



25 0 25 50
SCALE IN FEET

S 0 S 10 20
SCALE IN METERS



WR2
AREA = 575 SQ.YDS.
VOLUME = 975 CU.YDS.

WR1
AREA = 800 SQ.YDS.
VOLUME = 1350 CU.YDS.

LEGEND

- ⊗ XRF SAMPLE
- ⊗^w WATER SAMPLE GROUND AND SURFACE
- OPEN ADIT
- COLLAPSED ADIT
- DRAINAGE
- DRY DRAINAGE
- IMPROVED ROAD
- UNIMPROVED ROAD
- ↑ SLOPE DIRECTION
- WASTE ROCK DUMP OR TAILINGS PILE

GPS FILE CREATED 9/26/95

DRAWN FOR: PIONEER TECHNICAL SERVICES, INC. P.O. BOX 3445 BUTTE, MT 59702	TITLE: BELFONT PA# 23-060
	DRAWING NO.: PT342122 DATE: 5/22/96 PLOT SCALE: 1" = 15'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Tuesday, Liebelt

[illegible]

pH readings were taken directly on-site (Kelvey Meter).

Comments or deviations from SOPs: 23-060-WR-1 is a composite of WR-1A, -1B, -2A, and -2B. Background sample was collected at the Tiger Mine (23-059-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X, Number:____ Identification: Flows at wetter times of the year

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes____, No X;

Number of well logs:_____

Distance to nearest well used for drinking:

____<1,000 ft;____1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable X, Possible____, Unlikely____.

High metals, low pH in uncontained source; shallow groundwater.

Approximate Depth to Groundwater: X<25 ft;____ 25 - 100 ft;____ >100 ft.

Other observations/notes: N/A

SAMPLERS:

FLOW: Estimated (E) or Measured (M) from edit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Daisy Creek, Galena Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0.5 cfs

High Flow: 2 cfs, Average Flow: 0.5 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes , No X, Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Dry Fork Belt Creek has wetland, agriculture, and fishery; above confluence with Galena Creek, Dry Fork Belt Creek is reported to contain Cutthroat Trout (sensitive species).

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Tuesday, Liebelt

[illegible]

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH \leq 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approximately 2 acres in floodplain

Wetlands present: Yes ☐, No ☒, Describe: _____

Carbonate rocks/soils: Yes ☒, No ☐, Describe: Local limestone is abundant.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ☐; 10-30 ☒; 30-100 ☐; 100-300 ☐; 300-1,000 ☐; 1,000-3,000 ☐; 3,000-10,000 ☐; 10,000 or greater ☐; Comments Town of Barker has 5 full-time residents, additional summer residents.

Nearest residence: ☐ <1,000 ft; ☐ 1,000 ft - 0.5 miles; ☒ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Tuesday, Liebelt

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply):____ Easily accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes____, No X, Comment_____

Bat Habitat - Yes____, No X, Comment Adit has door

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 3

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Open adit

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Cabin north of stream

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Highwall at collapsed adit

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Belfont, Prepared by Chen-Northern, September 11, 1989.

USGS, Topographic Map, Barker, Montana, 7 1/2 minute Quadrangle, 1961.

LABORATORY ANALYTICAL DATA

**BELFONT
PA NO. 23-060**

BELFONT MINE PA# 23-060
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/26/96

SOLID MATRIX ANALYSES

Metals in soils Results per dry weight basis																	
FIELD ID	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fa (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
23-060-SE-1	7.1 U	39.9	265	10.0 J	2130	5.9	5.3	482	47200	1410	1090	5630	0.15	5.0	4.9	1540 J	NR
23-060-SE-2	7.2 U	152	818	25.1 J	16100	5.6	2.5 U	1820	98000	9120	9940	17300	0.28	3.2 U	38.4	4960 J	NR
23-060-WR-1	7.8 J	1030	529	5.7 J	37.0	8.0	2.0 U	45.4	44600	2850	483	151	1.2	2.6 U	49.7	872 J	NR
BACKGROUND	3.98 U	5.1 J	159 J	1 U	NR	8.09 J	3.83	9.81 J	13300	61.4	NR	548	0.0272	7.93	NR	130	NR
Acid/Base Accounting																	
FIELD ID	TOTAL SULFUR %	Acid Base Potential	Neutral Potential	Total Sulfur Acid Base Potential	Sulfide Sulfur %	Pyritic Sulfur %	Organic Sulfur %	Pyritic Sulfur Acid Base Potential	Pyritic Sulfur Acid Base Potential	Lime Req. Sobeik (lb/1000)	Lime Req. Sobeik (lb/1000)	Potential Acidity	Lime Req. Dolphoff (lb/1000)	Lime Req. Sobeik (lb/1000)	Lime Req. Dolphoff (lb/1000)	Lime Req. Sobeik (lb/1000)	Lime Req. Dolphoff (lb/1000)
23-060-WR-1	1.44	45.0	-9.78	-54.8	0.77	0.14	0.53	4.37	-14.20	-14.20	-29.82	38.99	-60.96	-128.01			

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision; NR- Not Requested

WATER MATRIX ANALYSES

Metals in Water Results in ug/l																	
FIELD ID	Sb (ug/L)	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Ca (ug/L)	Cr (ug/L)	Co (ug/L)	Cu (ug/L)	Fa (ug/L)	Pb (ug/L)	Mg (ug/L)	Mn (ug/L)	Hg (ug/L)	Ni (ug/L)	Ag (ug/L)	Zn (ug/L)	HARDNESS (mg CaCO3/L)
23-060-SW-1	2.7 U	1.9	27.0	3.3	55800	9.6 U	10.9 U	142	357	32.3 JX	18100	844 J	0.16 U	13.9 U	0.66 JX	918	214
23-060-SW-2	2.7 U	1.8 U	24.8	4.3	60800	9.6 U	10.9 U	197	481	41.2 JX	19700	1060 J	0.16 U	13.9 U	2.7 JX	1020	233
Wet Chemistry Results in mg/l																	
FIELD ID	Total Dissolved Solids	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE												
23-060-SW-1	306	< 5	170	NR	NR												
23-060-SW-2	305	< 5	188	NR	NR												

Legend

SE-1- Downstream of site in Daisy Creek.
 SE-2- Upstream of site in Daisy Creek
 WR-1- Composite of WRTA, WR1B, WR2A, & WR2B.
 BACKGROUND- From the Tiger Mine (23-059-SS1) (1993 data).
 SW-1- Same as SE-1.
 SW-2- Same as SE-2.

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision; NR- Not Requested



XRF ANALYSIS RESULTS

BELFONT

PA NO. 23-060



Mine Name: Belfont PA No. 23-060
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
23-060-WR1A	972.62 *	25235	1324.9	3117.3	609.94 *	1154.4 *	45460	783.48 *		87.521 *	1399.2	1092.4	
23-060-WR1B		25393	1349.5	787.2 *			37164					2681.1	
23-060-WR2A		29699	1766.4	1343.3			12024				173.83 *		
23-060-WR2B		10479	1146.8	1014.2		852.44 *	124579	1928 *		119.81 *	1379.6	486.94 *	
23-060-WR1-COMP		19904	1623.3	1089.5		602.7 *	55561				624.58	935.52	
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
23-060-WR1A	187.44	148.23	16.881 *	2892.4		303.03			69.494 *	14076	205.64 *		
23-060-WR1B	164.19	154.66	16.746 *	1214.2		199.19				1957.2			
23-060-WR2A	206.31	181.08		876.98		229.77				1841.8	84.998 *	25.987 *	29.582 *
23-060-WR2B	137.66	158.58		5886.7		101.28 *				868.3	163.47 *	16.133 *	43.788 *
23-060-WR1-COMP	177.26	168.83		2361.9		200.74				4172.6	157.62 *	16.368 *	17.364 *

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**BELFONT
PA NO. 23-060**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

BELFONT
23-060

LINE NO.				
1		GROUNDWATER PATHWAY		
2		OBSERVED RELEASE		0
3A	GW - LIKELIHOOD	EXCEEDENCES		0
3B	OF RELEASE	CONTAINMENT		20
3C		GW DEPTH		20
4		POTENTIAL TO RELEASE	LINES 3A x 3B	400
5		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
6	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	4.194
7	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
8		WELLS - 1 TO 4 MI		0
9		NEAREST WELL		0
10		TARGETS SCORE	LINES 6 + 7 + 8	0.0
		GROUNDWATER SCORE	LINES 4 x 5 x 9	0
11		SURFACE WATER PATHWAY		
12		OBSERVED RELEASE		0
13A	SW - LIKELIHOOD	EXCEEDENCES		0
13B	OF RELEASE	CONTAINMENT		20
13C		DISTANCE TO SW		20
14		POTENTIAL TO RELEASE	LINES 13A x 13B	400
15		LIKELIHOOD SCORE *	LINES 11 + 12 + 13C	400
16	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	4.508
17		DRINKING WATER POP'N		0
18		IMPACTED DRAINAGE		0
19	SW - TARGETS	WETLANDS		10
20		FISHERY		5
21		RECREATION		5
22		IRRIGATION/STOCK		2
23		T & E SPECIES HABITAT		0
24		TARGETS SCORE	SUM LINES 16 THRU 22	22
		SURFACE WATER SCORE	LINES 14 x 15 x 23	39670
25		AIR PATHWAY		
26A	AIR - LIKELIHOOD	OBSERVED RELEASE		0
26B	OF RELEASE	CONTAINMENT		10
26C		DISTANCE TO POPULATION		5
27		POTENTIAL TO RELEASE	LINES 26A x 26B	50
28		LIKELIHOOD SCORE	LINES 25 + 26C	50
29	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.451
30		POPULATION - 4 MILES		10
31	AIR - TARGETS	NEAREST RESIDENCE		0
32		WETLANDS		0
33		PARKS / WILDERNESS		0
34		T & E SPECIES HABITAT		0
35		TARGETS SCORE	SUM LINES 29 THRU 33	10
		AIR PATHWAY SCORE	LINES 27 x 28 x 34	226
36		DIRECT CONTACT PATHWAY		
37A	LIKELIHOOD OF	OBSERVED EXPOSURE		0
37B	EXPOSURE	ACCESSIBILITY		10
37C		DISTANCE TO POPULATION		5
38		POTENTIAL EXPOSURE	LINES 37A x 37B	50
39		LIKELIHOOD SCORE	LINES 36 + 37C	50
40	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.419
41	DIRECT CONTACT	POPULATION - 1 MILE		1
42	TARGETS	NEAREST RESIDENCE		0
43		RECREATIONAL USE		0
44		TARGETS SCORE	SUM LINES 40 THRU 42	1
		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	21
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000			0.40

LINE NO.			SITE NAME:	BELFONT
			PA NUMBER:	23-060
1	<u>SITE SAFETY</u>			
2	THREAT	ACCESSIBILITY		1
3		OPEN SHAFTS	100 EA.	0
4	HAZARDS	OPEN ADITS	50 EA.	50
5		UNSTAB. HIWALLS / PITS	75 EA.	75
6		HAZ. STRUCTURES	40 EA.	0
7		EXPLOSIVE HAZARD		0
8		HAZ. MATERIALS		0
9		HAZARDS SCORE	SUM LINES 2 THRU 7	125
10	TARGETS	POPULATION - 1 MILE		1
11		NEAREST RESIDENCE		0
12		RECREATIONAL USE		0
13		TARGETS SCORE	SUM LINES 9 THRU 11	1
		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	1.25



23-060, #1: New side of road (dozed up)

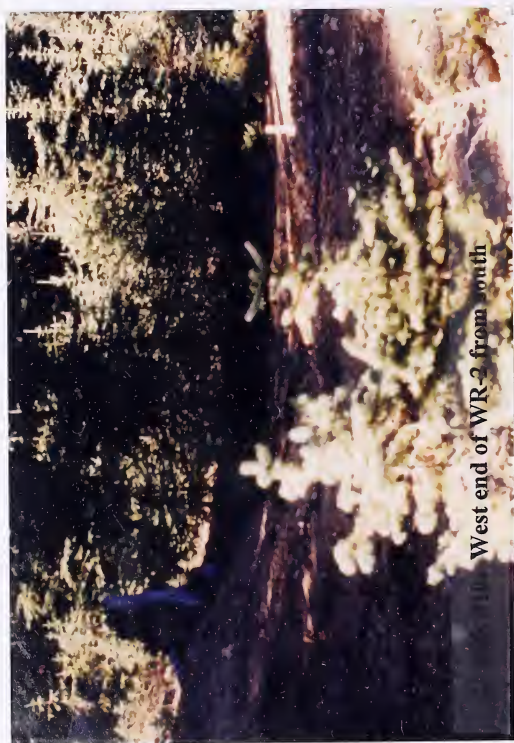


23-060, #6: One collapsed adit and one gated adit



1000-2000 ft. 1000

1000-2000 ft. 1000



West end of WR-2 from south

1000-2000 ft. 1000

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: SINCLAIR PA#: 23-501

Date: September 27, 1995 Time: 0915-1130

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer
Liebelt, Pioneer

Visitors: Gwen McBride, owner & Barker resident

Weather/Seasonality Observations: Cool; sunny; calm.

Photographic Log (Photo No.'s/Video Tape Number): #1: WR-1 (Note: Caving
bank into stream); #2: Adit at WR-1; #3: Settling pond in creek
above WR-1. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Water up and downstream has yellow waste rock and iron precipitate
in it. Noted camping site setup 25' below the mine with a hose to
stream, cement pad for parking, septic system hookup, and faucet on
ground by bridge; hoses had yellow staining on them.
Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Move or
isolate waste rock dump from stream; grade, amend, and revegetate
dump.



I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SINCLAIR PA#: 23-501

Legal Description: T 15N; R 9E; Sec. 7, NE 1/4 NW 1/4 1/4

County: JUDITH BASIN Mining District: HUGHESVILLE

Latitude: N 47° 04' 55" Longitude: W 110° 38' 07"

Primary Drainage Basin and Code: Dry Fork Belt Creek/10030105

Secondary Drainage Basin: Galena Creek

USGS Quadrangle map name(s): Barker

Mine Type/Commodities: Hardrock/Lead, Silver

Activity Status: Active, Inactive/Exploration, Abandoned X.

Ownership status: Known Y X N; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Gwen McBride,

P.O. Box 905, Monarch, MT 59463.

Relationship to other mines/sites in the area/district: 1/3 mile southeast of the Wright & Edwards Mines. Mine may have been connected underground to Block P Mine.

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? Unknown

General site features: Elevation 5920', Slope 20°,

Aspect Southeast

Land use: Mining X, Recreational X, Residential , Urban ,

Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 0.20 acre(s).

Site Dimensions: 175 feet x 100 feet

Predominant vegetation types: Lodgepole pine, grasses

Access: roads - good (paved) , poor (maintained dirt road) ,

4wd X, trail .

Other logistical considerations (proximity to other sites). Just off of Galena Creek Road

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Mine is on the south side of an unnamed
tributary of Galena Creek. Water flows southeast approximately 500
feet to confluence with Galena Creek, which flows south
approximately 1.75 miles to confluence with Dry Fork Belt Creek.
Dry Fork Belt Creek flows west. The Wright and Edwards Mines are
approximately 1/3 mile up drainage. The site is underlain by
Hughesville porphyry.

Mining/milling history, ore type/tenor, host rock, gangue: Mine is
on Defiance vein. Vein mineralization in the area consisted of
pyrite, sphalerite, and argentiferous galena within a gangue of
quartz, barite, and rhodochrosite within the Hughesville porphyry.

Mine Operation?

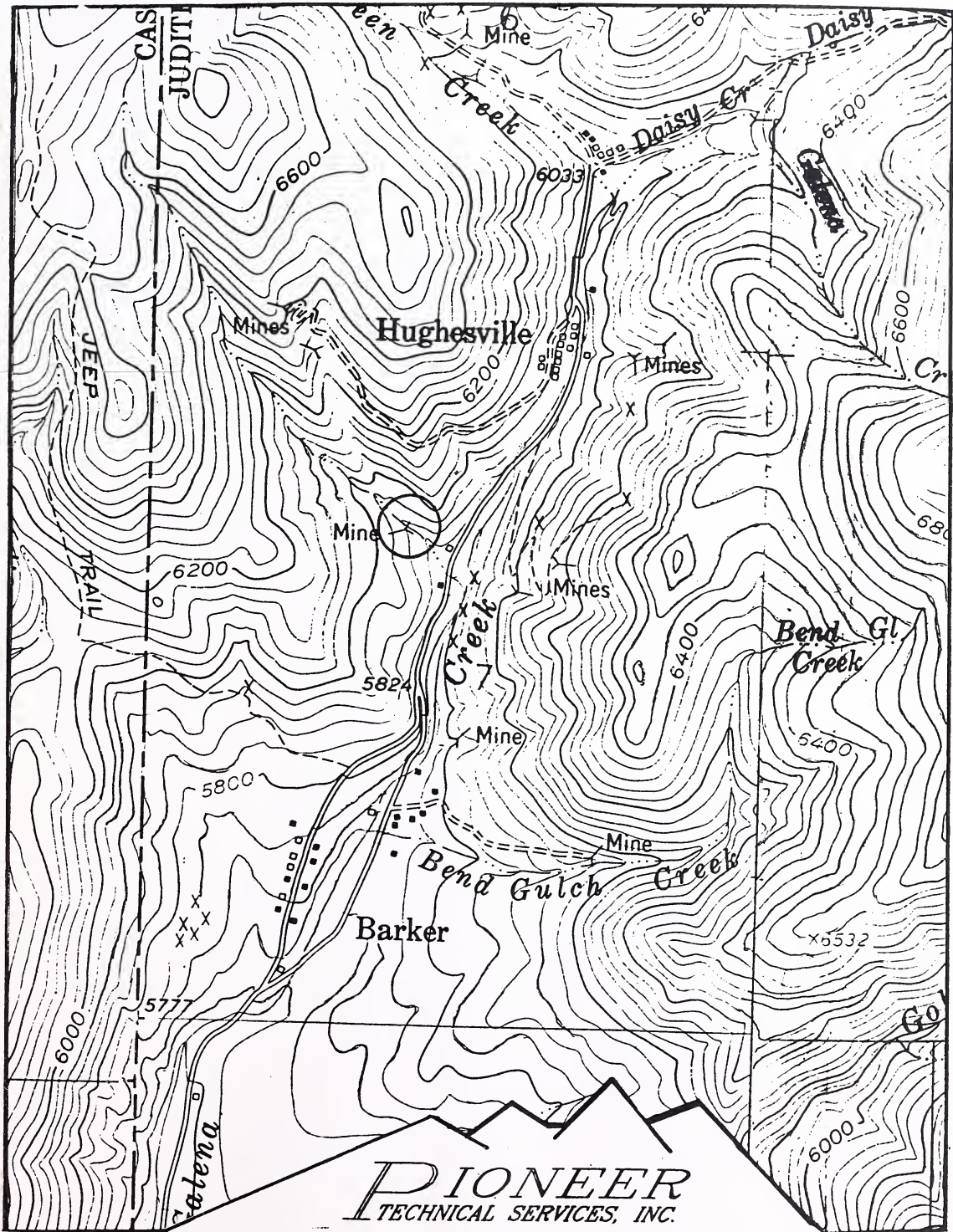
Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes X, No___, # 1, Comment Open with wooden door
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes___, No X, # ____, Comment_____
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes___, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

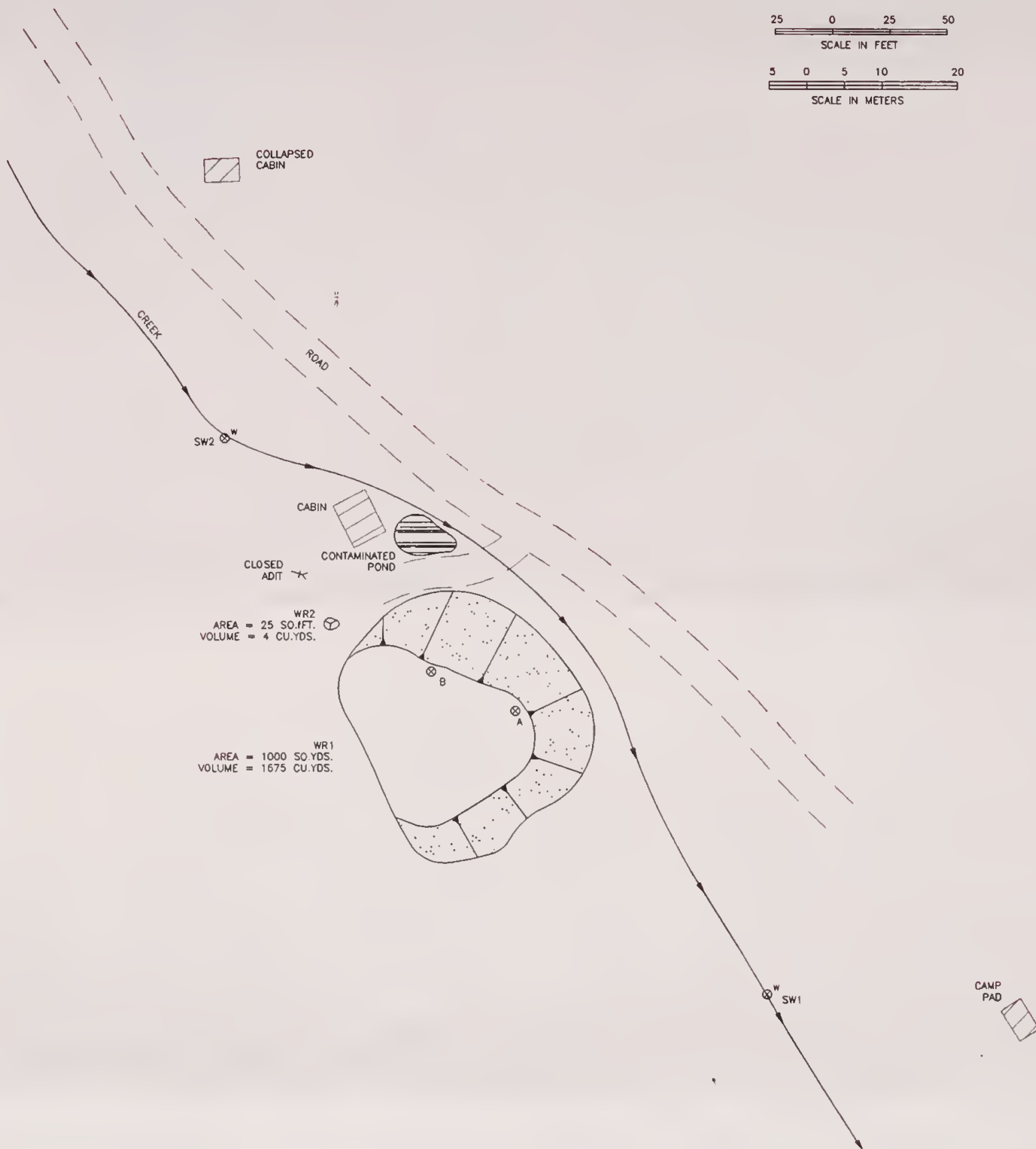
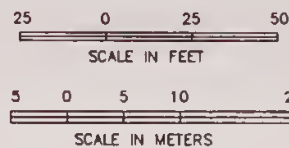


PIONEER
TECHNICAL SERVICES, INC.

SINCLAIR, P.A. NO. 23-501

T15N. R09E, SECTION 07

SCALE: 1" = 1000'



LEGEND

- | | | | |
|----------------|---------------------------------|-----------|----------------------------------|
| ⊗ | XRF SAMPLE | ===== | IMPROVED ROAD |
| ⊗ ^W | WATER SAMPLE GROUND AND SURFACE | - - - - - | UNIMPROVED ROAD |
| Y | OPEN ADIT | ▨ | STRUCTURE |
| + | COLLAPSED ADIT | ⊗ | PONDED WATER |
| → | DRAINAGE | ↓ | SLOPE DIRECTION |
| → | DRY ORAINAGE | ⬢ | WASTE ROCK DUMP OR TAILINGS PILE |

GPS FILE CREATED 9/27/95

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 59702

TITLE:

SINCLAIR
PA# 23-501

DRAWING NO.: PT34212D
DATE: 3/7/96

PLOT SCALE: 1 = 15

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Liebelt

[illegible]

pH readings were taken directly on-site (Kelway Meter).

Comments or deviations from SOPs: 23-501-WR-1 is a composite of WR-1A and -1B. Background sample was collected at the Tiger Mine (23-059-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map

Flowing adits: Yes____, No X, Number:____ Identification:_____

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes____, No X;

Number of well logs:_____

Distance to nearest well used for drinking:

____<1,000 ft;____1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable____, Possible X, Unlikely____.

Uncontained source; shallow groundwater near stream.

Approximate Depth to Groundwater: X<25 ft;____ 25 - 100 ft;____ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, sheet, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Unnamed tributary of Galena Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Small settling pond in creek above road

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0.05 cfs

High Flow: 0.25 cfs, Average Flow: 0.05 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes , No X, Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, agriculture, recreation, wetlands, fishery

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Up and downstream full of waste rock from Wright & Edwards

SAMPLERS: Flammang, Liebelt

FLOW: Estimated (E) or Measured (M)?

MDEQ/AMRB-PIONEER 01/12/96

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 acre north of site

Wetlands present: Yes___, No X, Describe: _____

Carbonate rocks/soils: Yes X, No___, Describe: Limestone bedrock

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments Town of Barker

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Liebelt

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10____; 10-30 X; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Town of Barker

Evidence of recreational use on site: Yes X, No____, Describe:_____
Camping facilities

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 6

Sport Fishery Classification - 6

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Adit with gate

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Cabin

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 1, types and locations: WR-1 is undercut by the stream on
north side.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

USGS, Topographic Map, Barker, Montana, 7 1/2 minute Quadrangle, 1961.

LABORATORY ANALYTICAL DATA

**SINCLAIR
PA NO. 23-501**

Sinclair Mine PA# 23-501
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/27/95

SOLID MATRIX ANALYSES

FIELD ID	Metals in soils Results per dry weight basis															CYANIDE (mg/kg)				
	Sh (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Ca (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)				
23-501-SE-1	15.4 J	664	313	6.5 J	1610	5.7	3.1 U	236	40700	9960	810	289	1.7	3.9 U	115	1100 J	NR			
23-501-SE-2	10.3 J	157	77.0	1.2 J	695	2.6	2.3 U	6380	9910	5000	386	96.3	0.18	2.9 U	28.3	204 J	NR			
23-501-WR-1	7.2 J	203	191	1.3 J	698	1.5 U	1.7 U	33.0	16000	5000	78.7	35.7	1.1	2.2 U	28.8	200 J	NR			
BACKGROUND	3.98 UJ	5.1 J	159 J	1 U	NR	8.09 J	3.83	9.81 J	13300	61.4	NR	548	0.02772	7.93	NR	130	NR			
Acid/Base Accounting																				
FIELD ID	Total Sulfur			Total Sulfur			Pyritic Sulfur			Pyritic Sulfur			Lime Req. Sobeik			Lime Req. Dolhopf				
	TOTAL Sulfur %	Acid Base %	Neutral Potent. %	TOTAL Sulfur %	Acid Base %	Neutral Potent. %	Pyritic Sulfur %	Acid Base %	Potential %	Pyritic Sulfur %	Acid Base %	Potential %	Lime Req. Sobeik %	Acid Base %	Potential %	Lime Req. Dolhopf %	Acid Base %	Potential %		
23-501-WR1	0.57	17.8	-3.14	-20.9	0.51	0.51	0.03	0.03	0.94	-4.08	-4.08	-8.57	-4.08	-8.57	13.83	-21.21	-44.54			

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

WATER MATRIX ANALYSES

WATER MATRIX ANALYSES																		
FIELD ID	Metals in Water Results in µg/l															HARDNESS (mg CaCO ₃ /l)		
	Sh (µg/L)	As (µg/L)	Ba (µg/L)	Cd (µg/L)	Ca (µg/L)	Cr (µg/L)	Co (µg/L)	Cu (µg/L)	Fe (µg/L)	Pb (µg/L)	Mg (µg/L)	Mn (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	HARDNESS (mg CaCO ₃ /l)	
23-501-SW-1	2.7 U	3.8	21.3	17.2	26300	9.6 U	10.9 U	48.2	2000	121 JX	3090	1700 J	0.16 U	13.9 U	0.70 JX	2780	78.4	
23-501-SW-2	2.7 U	4.9	23.3	12.2	26100	9.6 U	10.9 U	51.3	2190	24.1 JX	2710	1260 J	0.16 U	13.9 U	0.21 UJ	2560	76.4	
Wet Chemistry Results in µg/l																		
FIELD ID	Total Dissolved Solids			CHLORIDE			SULFATE			NO ₃ NO ₂ -N			CYANIDE					
	127	<	5	82	57	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
23-501-SW-1	127	<	5	82	57	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
23-501-SW-2	129	<	5	57	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		

Legend

SE-1: 100 feet below WR1 in tributary of Galena Creek
SE-2: 50 feet above site in tributary of Galena Creek
WR-1: Composite of WR1A & WR1B
BACKGROUND: From the Tiger Mine (23-059-S11) (1993 data).
SW-1: Same as SE-1.
SW-2: Same as SE-2.

U: Not Detected, 1: Estimated Quantity, X: Outlier for Accuracy or Precision, NR: Not Requested

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

Legend

SE-1- 100 feet below WR1 in tributary of Galena Creek
 SE-2- 50 feet above site in tributary of Galena Creek
 WR-1- 100 feet below WR1A & WR1B
 BACKGROUND- From the Tiger Miller (23-509-SS1) (1983 data).
 SW-1- Same as SE-1
 SW-2- Same as SE-2



XRF ANALYSIS RESULTS

**SINCLAIR
PA NO. 23-501**

Mine Name: Sinclair PA No. 23-501
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrH	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
23-501-WR1A			33274	1453.3	1271.9		639.95 *	27599			301.36		
23-501-WR1B			32655	1851.4	3757.8		38670				161.41 *		
23-501-WR2	468.16 *		29034	1743	2007.3		53868	948.28 *		890.5	1146		
23-501-WR1-COMP			29479	1723.3	1821.5		28637				236.91		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
23-501-WR1A	215.21	280.24			6188.8	334.41					1294.7	131.87 *	23.954 *
23-501-WR1B	275.79	352.9			3830	258.76					1603.6		31.908 *
23-501-WR2	127.33	194.62	17.253 *		17529	234.64	278.16 *		101.17 *	594.02	344.85 *	35.472 *	33.431 *
23-501-WR1-COMP	292.06	236.03	8.2385 *		4034.7	275.29				1529.5	95.921 *	21.313 *	27.125 *

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**SINCLAIR
PA NO. 23-501**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

SINCLAIR
23-501

LINE NO.				
1		GROUNDWATER PATHWAY		
2		OBSERVED RELEASE		0
3		EXCEEDENCES		0
3A	GW - LIKELIHOOD	CONTAINMENT		20
3B	OF RELEASE	GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	5.174
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		0
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	0.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9	0
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		300
12		EXCEEDENCES		50
13A	SW - LIKELIHOOD	CONTAINMENT		20
13B	OF RELEASE	DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	750
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	5.672
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19	SW - TARGETS	FISHERY		0
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	18
24		SURFACE WATER SCORE	LINES 14 x 15 x 23	76572
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD	CONTAINMENT		10
26B	OF RELEASE	DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	100
27		LIKELIHOOD SCORE	LINES 25 + 26C	100
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.057
29		POPULATION - 4 MILES		10
30		NEAREST RESIDENCE		5
31	AIR - TARGETS	WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	15
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34	86
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		50
37A	LIKELIHOOD OF	ACCESSIBILITY		20
37B	EXPOSURE	DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	250
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.052
40	DIRECT CONTACT	POPULATION - 1 MILE		10
41	TARGETS	NEAREST RESIDENCE		5
42		RECREATIONAL USE		10
43		TARGETS SCORE	SUM LINES 40 THRU 42	25
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	325
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000			0.77

LINE NO.	SITE NAME: PA NUMBER:		SINCLAIR 23-501
	<u>SITE SAFETY</u>		
1	THREAT	ACCESSIBILITY	20
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	0
5		HAZ. STRUCTURES 40 EA.	40
6		EXPLOSIVE HAZARD	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	90
9		POPULATION - 1 MILE	10
10	TARGETS	NEAREST RESIDENCE	5
11		RECREATIONAL USE	10
12		TARGETS SCORE SUM LINES 9 THRU 11	25
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	45.00



23-501, #1: WR-1 (Note: Caving bank into stream)



23-501, #2: Adit at WR-1



g pond in creek above WR-1

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: MAY AND EDNA PA#: 23-502

Date: September 26, 1995 Time: 1130-1330

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Liebelt, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; clear; breezy.

Photographic Log (Photo No.'s/Video Tape Number): #11: North end of WR-1
(Green Creek in foreground); #12: Middle north of WR-1; #13:
Middle south of WR-1; #14: South end of WR-1 (Note: Proximity to
Green Creek). Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is not included in the originally inventoried HMO site (SW NW
Sec.6, P.A. No. 23-026). It is down the hill and 1,000 feet east
of that site and is probably part of the same operation.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Remove waste
rock dumps from drainage, cover, and revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): MAY AND EDNA PA#: 23-502

Legal Description: T 15N ; R 9E ; Sec. 6 , SW 1/4 NW 1/4 1/4

County: JUDITH BASIN Mining District: HUGHESVILLE

Latitude: N 47° 05' 25" Longitude: W 110° 38' 36"

Primary Drainage Basin and Code: Dry Fork Belt Creek/10030105

Secondary Drainage Basin: Green Creek/Galena Creek

USGS Quadrangle map name(s): Barker

Mine Type/Commodities: Hardrock/Silver, Lead

Activity Status: Active, Inactive/Exploration, Abandoned X.

Ownership status: Known Y X N; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Gwen McBride,
P.O. Box 905, Monarch, Montana 59463.

Relationship to other mines/sites in the area/district: Near most
of the mines in the Hughesville District

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown

General site features: Elevation 6360', Slope 20°,
Aspect East

Land use: Mining X, Recreational X, Residential , Urban ,
Agricultural X, Other (Specify)

Area of disturbed/unvegetated lands? 0.5 acre(s).

Site Dimensions: 225 feet x 75 feet

Predominant vegetation types: Fir, Lodgepole pine; grasses,
wildflowers in drainage.

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X, trail .

Other logistical considerations (proximity to other sites). 1/4
mile northwest of the Carter Mine

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Green Creek flows southeast past the site
(dry in September) 0.5 mile to Galena Creek, which flows south to
confluence with Dry Fork Belt Creek approximately 3 miles below;
Dry Fork Belt Creek flows west. Limestone is present in dump.

Mining/milling history, ore type/tenor, host rock, gangue: Site
was associated with workings up the hill inventoried as PA No. 23-
026; may have been load out area.

Mine Operation?

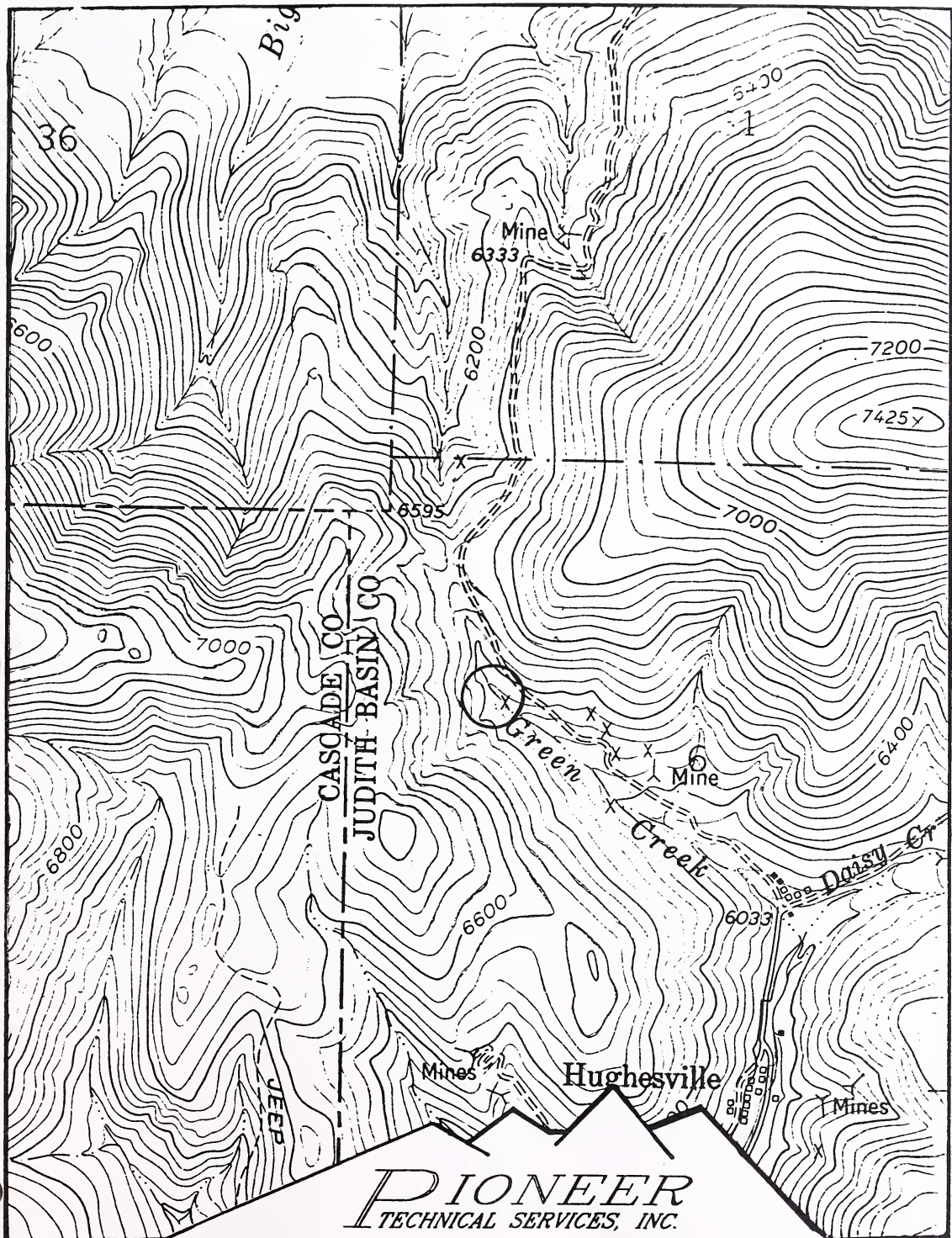
Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes X, No___, # 1, Comment Possible small caved
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes___, No X, # ____, Comment_____
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes___, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: N/A

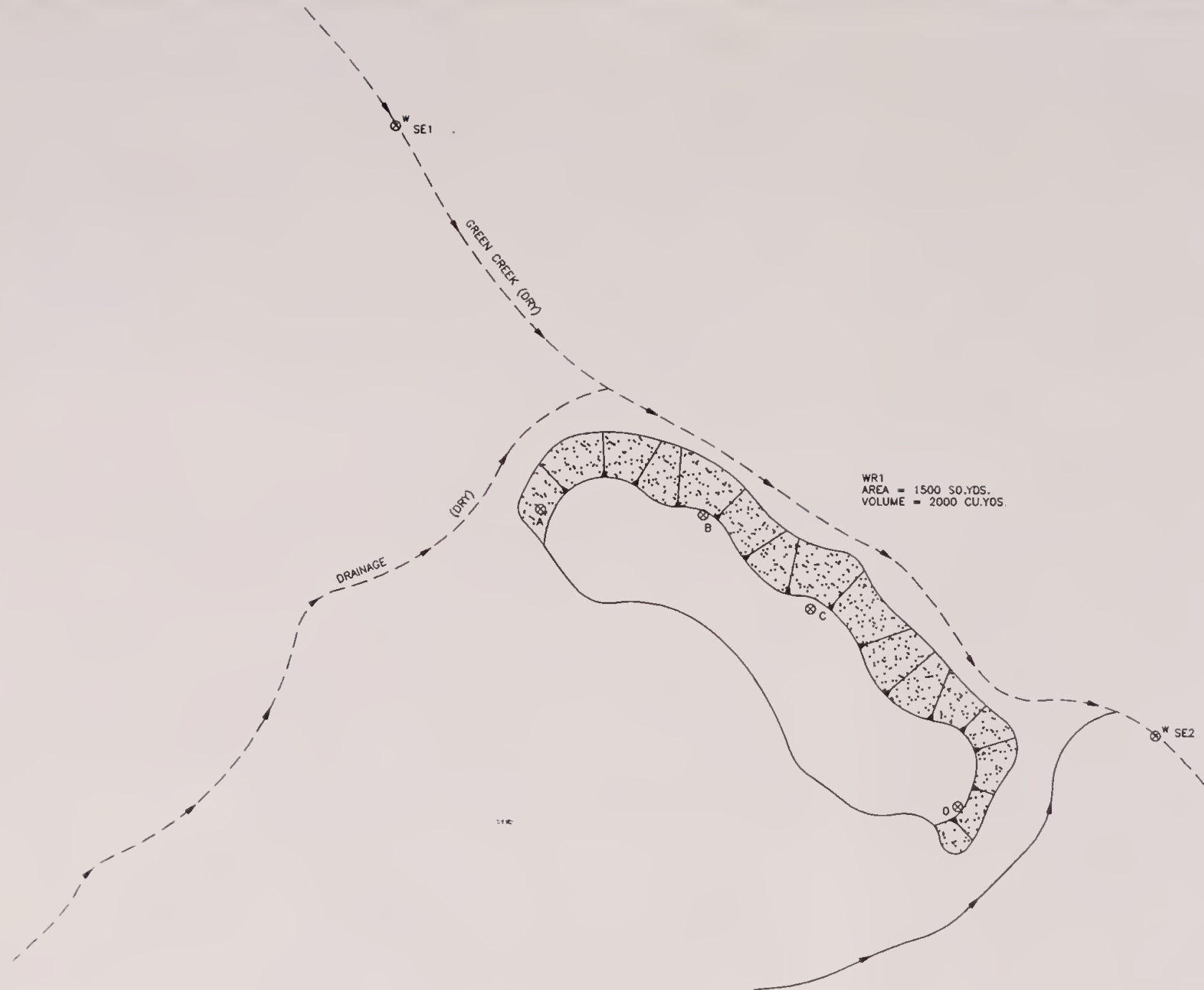
Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A



MAY AND EDNA, P.A. NO. 23-502


T15N. R09E. SECTION 06

SCALE: 1" = 1000'




WR1
 AREA = 1500 SQ.YDS.
 VOLUME = 2000 CU.YDS.

LEGEND

- ⊗ XRF SAMPLE
- ⊗^W WATER SAMPLE GROUND AND SURFACE
- DRAINAGE
- - -→ DRY DRAINAGE
- ↓ SLOPE DIRECTION
-  WASTE ROCK DUMP OR TAILINGS PILE

GPS FILE CREATED 9/26/95

DRAWN FOR:  PIONEER TECHNICAL SERVICES, INC. P.O. BOX 3445 BUTTE, MT 59702	TITLE: MAY & EDNA PA# 23-502
	DRAWING NO.: PT342119 DATE: 3/7/96
	PLOT SCALE: 1 = 15

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Flammang, Liebelt

[illegible]

* pE readings were taken directly on-site (Kelway Meter).

Comments or deviations from SOPs:	Background
23-502-WR-1 is a composite of WR-1A through -1D. Background sample was collected at the Tiger Mine (23-059-SS-1) during the 1993 investigation.	

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes X, No___, Number:___ Identification: Unknown;
somewhere uphill to the southwest of the site

Groundwater wells within 4 miles?: Yes___, No X;

Number of well logs:_____

Distance to nearest well used for drinking:

___<1,000 ft;___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Spring, shallow water in floodplain; low pH, high metals.

Approximate Depth to Groundwater: X<25 ft;___ 25 - 100 ft;___ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

LOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Small, unnamed spring flows to the south of the site.

Dry streambeds: Yes X, No , Name(s): Green Creek is adjacent to the site.

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1 is in Green Creek.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? Dry
High Flow: 0.5 cfs, Average Flow: 0

Distance between waste source(s) and nearest surface water body (ft)? 0 feet when Green Creek is flowing; 20 feet from spring flow.

Surface water draining onto or through waste sources: Yes , No X, Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Agriculture, fishing, wetlands; endangered plant along Dry Fork Belt Creek approximately 1 mile from confluence with Galena Creek.

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Flammang

2 (M) per month to (T) per month

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

$pH \leq 5.0$ (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 0.5 acre

Wetlands present: Yes____, No X, Describe:_____

Carbonate rocks/soils: Yes X, No , Describe: Limestone host rock

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater ___; Comments Town of Barker

Nearest residence: <1,000 ft; X 1,000 ft - 0.5 miles; >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

SAMPLERS: Flammang, Liebelt

[illegible]

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences, gates, or warning signs;____ Moderately Accessible - barbed wire fences, road gated, or signs posted;____ Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes____, No X, Comment_____

Bat Habitat - Yes____, No X, Comment_____

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 6

Sport Fishery Classification - 6

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____, types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X, Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for SW NW Section 6, Prepared by Chen-Northern, August 27, 1989.

USGS, Topographic Map, Barker, Montana, 7 1/2 minute Quadrangle, 1961.

LABORATORY ANALYTICAL DATA

**MAY AND EDNA
PA NO. 23-502**

May & Edna PA# 23-502
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/26/95

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
23-502-SE-1	4.4 UJ	24.0	70.2 J	1.0 J	91600	5.1	3.2	4.38 JX	14000	320	35400	677	0.040 U	7.4	0.6 U	156	NR
23-502-SE-2	6.4 UJ	30.4	276 J	7.0 J	27100	3.8	15.4	87.0 JX	20700	383	14800	2950	0.056 U	13.5	4.3	1360	NR
23-502-WR-1	5.0 UJ	71.6	45.1 J	9.6 J	8700	6.5	1.6 U	1120 JX	135000	1740	983	229	0.41	11.6	54.8	491	NR
BACKGROUND	3.98 UJ	5.1 J	159 J	1 U	NR	8.09 J	3.83	9.81 J	13300	61.4	NR	548	0.02772	7.93	NR	130	NR
Acid/Base Accounting																	
	TOTAL SULFUR %	Total Sulfur %	Neutral Potent. U/1000g	Tot. Sulfur Acid Base Potential U/1000g	Sulfate Sulfur %	Pyritic Sulfur %	Organic Sulfur %	Pyritic Sulfur Acid Base Potential U/1000g	Pyritic Sulfur Acid Base Potential U/1000g	Lime Req. Sobeik (lbs/ton)	Lime Req. Sobeik (lbs/ton)	Potential Acidity	Lime Req. Dolphoff (lbs/ton)	Lime Req. Dolphoff (lbs/ton)			
23-502-WR-1	9.27	290	21.2	-268	<0.01	1.07	10.0	33.6	-12.30	-12.30	-25.83	345.94	-405.92	-852.44			

Legend

SE-1, 40 feet upstream of site in Green Creek.
SE-2, 25 feet downstream from site in Green Creek.
WR-1, Composite WR1A, 1B, 1C, 1D.
BACKGROUND: From the Tiger Mine (23-059-SS1) (1993 data).

U- Not Detected; J- Estimated Quantity; X- Outlier for Accuracy or Precision; NR- Not Requested

XRF ANALYSIS RESULTS

**MAY AND EDNA
PA NO. 23-502**

Mine Name: May & Edna PA No. 23-502

XRF SAMPLE I.D.	CrH	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Ba	Ag	U	Th	Se
23-502-WR1A		17899	6218.1	3384.1			32428					304.85	186.76 *	
23-502-WR1B		14528	37907	3063.4			1198.8 *	357.86 *			180.31 *	520.6	87.091 *	
23-502-WR1C		14394	6647.4	4361.6			24021					103.91 *	58.793 *	
23-502-WR1D		3842.5	1399.7			280.59 *		185.4 *			1498.9	971.5		
23-502-WR1-COMP	388.85 *	15519	15462	3129.2			1419.1 *	48444	782.46 *		1674.1	618.53		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb					
23-502-WR1A	647.7	263.64				965.36	113.26			2070.7	98.607 *	39.237 *	35.634 *	
23-502-WR1B	389.96	294.4				86.68 *	106.66			1275.7	50.381 *	64.931 *		
23-502-WR1C	731.17	336.7				117.74	130.08			1573.6	114.09 *	63.755	66.465	
23-502-WR1D		11.054 *		14.31 *		2149.1	55.28 *	262.6 *		50.948 *	253.68 *	44.422	44.422	
23-502-WR1-COMP	448.2	214.74				1283.9	141.76			949.54	129.25 *	19.026 *	69.451	

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**MAY AND EDNA
PA NO. 23-502**

AIMSS SCORESHEET

SITE NAME:

MAY AND EDNA

PA NUMBER:

23-502

LINE NO.			
GROUNDWATER PATHWAY			
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	0
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	5
31	AIR - TARGETS	WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	5
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		
	(LINES 10 + 24 + 35 + 44) / 100,000		

0.25

LINE
NO.

SITE NAME:

MAY AND EDNA

PA NUMBER:

23-502

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVE HAZARD		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	6
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.00



North end of WR-1 Green Creek in foreground



02, #12: Middle of WR-1



23-502, #13: Middle of WR-1



23-502, #14: South end of WR-1 (Note: Proximity to Green Creek)

BIG TIMBER
CANYON

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: KELLEY PA#: 34-113

Date: October 6, 1995 Time: 1430-1600

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: Tim Pfahler, MDEO Helicopter Pilot
Ben Quiñones, MDEO/AMRB

Weather/Seasonality Observations: Cold; sunny; 6" of snow on the ground.

Photographic Log (Photo No.'s/Video Tape Number): #12: WR-1 from top.
Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): No discharge at this time, but possible at wetter times. Small dump well above water (lake); no direct route to surface water. Dump partially vegetated. Inventoried as "Granite Mountain Mine" by Chen-Northern in 1989.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Grade and seed only; most of dump is naturally revegetated.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): KELLEY PA#: 34-113

Legal Description: T 3N ; R 12E ; Sec. 6 , SW 1/4 NW 1/4 1/4

County: PARK Mining District: BIG TIMBER CANYON

Latitude: N 46° 02' 07" Longitude: W 110° 17' 25"

Primary Drainage Basin and Code: Big Timber Creek/10070002

Secondary Drainage Basin: Blue Lake

USGS Quadrangle map name(s): Crazy Peak

Mine Type/Commodities: Hardrock/Silver-lead

Activity Status: Active, Inactive/Exploration, Abandoned X.

Ownership status: Known Y X N; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): Gallatin

National Forest with unpatented claims

Relationship to other mines/sites in the area/district: 1/2 mile north of Stewwinder

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? Unknown

General site features: Elevation 8560', Slope 20°, Aspect East

Land use: Mining___, Recreational X, Residential___, Urban___, Agricultural___, Other(Specify)_____

Area of disturbed/unvegetated lands? 0.1 acre(s).

Site Dimensions: 110 feet x 65 feet

Predominant vegetation types: Grasses, fir

Access: roads - good (paved)___, poor (maintained dirt road)___, 4wd___, trail X.

Other logistical considerations (proximity to other sites). 1/8 mile above recreational trail; approximately 2.5 miles from trailhead at campground.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Diorite bedrock. Site is located on the
shore of a small lake with no direct surface outlet.

Mining/milling history, ore type/tenor, host rock, gangue:
Discovered in 1900; last worked in 1929. Ore is in quartz vein in
shear zone of host diorite; limonite and magnesium-oxide abundant.
Ore minerals are argentiferous galena, pyrite, and chalcopyrite.

Mine Operation?

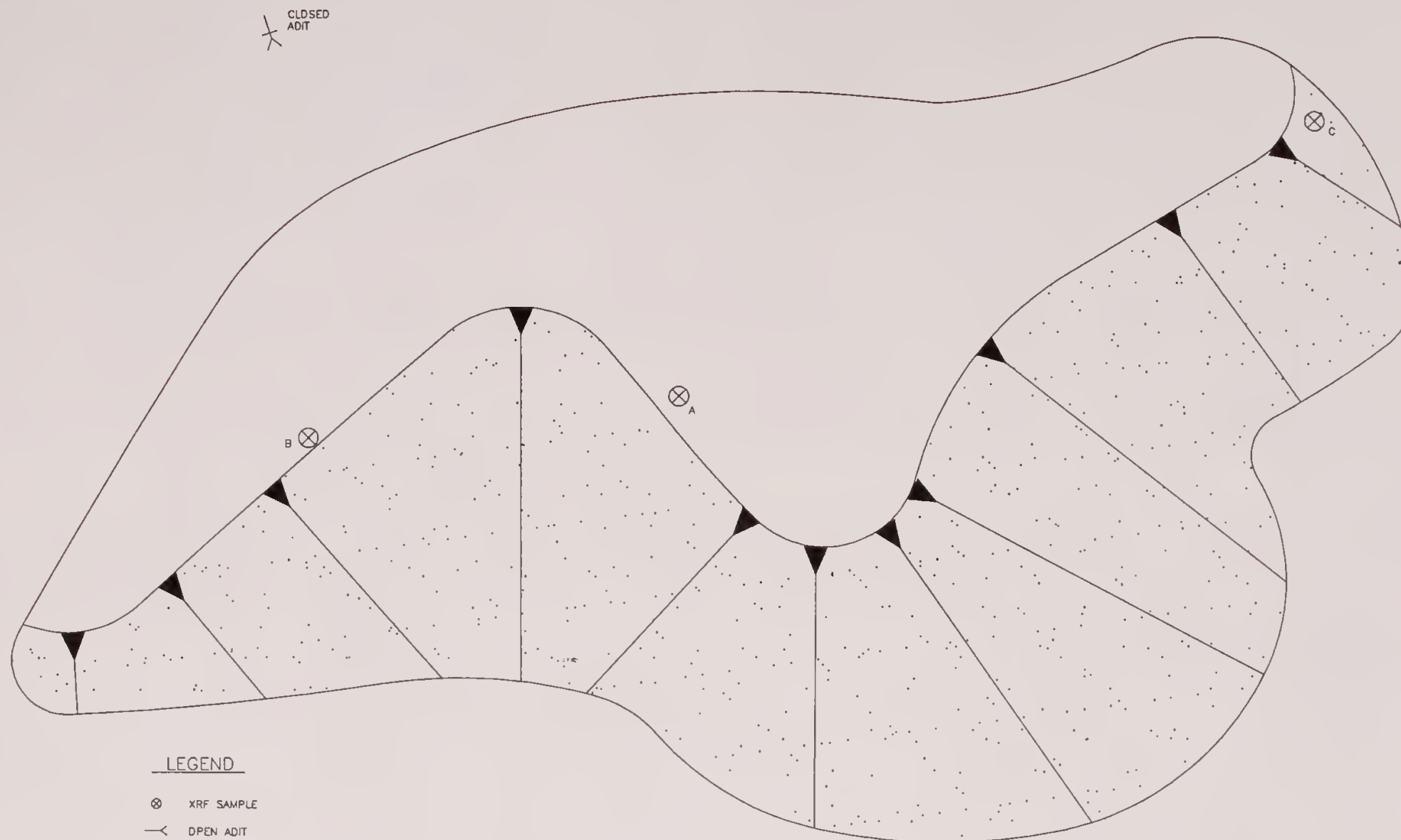
Shafts - Yes , No X, # , Comment
Adits - Yes X, No , # 1, Comment Caved; ponded water inside
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A



LEGEND

- ⊗ XRF SAMPLE
- OPEN ADIT
- + COLLAPSED ADIT
- ▲ SLOPE DIRECTION
- 🗑 WASTE ROCK DUMP OR TAILINGS PILE



WR1
AREA = 550 SQ.YDS.
VOLUME = 725 CU.YDS.

GPS FILE CREATED 10/6/95

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 59702

TITLE:

KELLEY MINE
PA# 34-113

DRAWING NO.: PT342118
DATE: 3/7/96

PLOT SCALE: 1 = 3

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Tuesday

[illegible]

* pH readings were taken directly on-site (Kelway Meter).

Comments or deviations from SOPs: 34-113-WR-1 is a composite of WR-1A through -1C. Background sample was collected at the Poorman/Emma site (49-001-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes___, No X, Number:___ Identification:_____

Groundwater wells within 4 miles?: Yes___, No X;

Number of well logs:_____

Distance to nearest well used for drinking:

___<1,000 ft;___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible___, Unlikely X.

Low metals; deeper groundwater; moderate pH

Approximate Depth to Groundwater:___<25 ft; X 25 - 100 ft;___ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, shaft, reep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes____, No X, Name(s): _____

Other surface water: Yes X, No____, Name(s)/Description: Small lake
100 feet below base of dump

Waste materials within any floodplain: Yes____, No X Source ID(s): _____

Approximate Flood frequency? ____1 yr, ____10 yr, ____100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)? 100 feet

Surface water draining onto or through waste sources: Yes____, No X,
Describe: _____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation,
residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands, fishery, recreation

Observed erosional/sedimentation/stream turbidity problems? Yes____,
No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures
or channel changes present): _____

SAMPLERS:

[illegible]

2 (K) perustov 20 (2) potvrdit: MOLE

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 2 acres

Wetlands present: Yes X, No , Describe: Along shores of lake and in
between small lake and Granite Lake

Carbonate rocks/soils: Yes____, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 X; 10-30 ; 30-100 ;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

SAMPLERS: Tuesday

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____
Site lies approximately 100 feet above a recreational trail.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes____, No X, Comment_____

Bat Habitat - Yes X, No____, Comment Possible in adit

Primary Drainage____; Secondary Drainage____; No Information X:

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - ____

Sport Fishery Classification - ____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Adit is partially open.

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

- Bailey, Clive R., Economic Geology Evaluation of Big Timber Project, Park and Sweetgrass Counties, Montana, Report for Viking Exploration, Inc., October 1980.
- MBMG, Mines and Mineral Deposits (Except Fuels), Park County, Montana, Information Circular 7546, Written by Glenn C. Reed, February 1950.
- MBMG, Well Log Database, July 14, 1994.
- MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.
- MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.
- MDEQ/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Granite Mountain Mine, Prepared by Chen-Northern, September 21, 1989.
- USGS, Topographic Map, Crazy Peak, Montana, 7 1/2 minute Quadrangle, 1972.

LABORATORY ANALYTICAL DATA

KELLEY

PA NO. 34-113

Kelly Mine PA# 34-113
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 10/6/95

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)	
34-113-WR-1	25.2 JX	145 J	433	5.2	15300	14.9 J	24.9 J	856 J	52900	2640 J	6980	4660	0.44 J	19.9 JX	22.3	193	NR	
BACKGROUND	7.97 UJ	16.3	78.3 J	0.68 J	NR	45.6	13.5	40.1 J	28500	37.2	NR	612	0.06378	24	NR	99	NR	
Acid/Base Accounting																		
	Total Sulfur			Tot. Sulfur			Pyritic Sulfur			Pyritic Sulfur			Pyritic Sulfur			Pyritic Sulfur		
	Acid Base Potential			Acid Base Potential			Acid Base Potential			Acid Base Potential			Acid Base Potential			Acid Base Potential		
	%			%			%			%			%			%		
	0.31			40.4			0.31			40.4			40.4			40.4		
	0.01			40.7			-0.01			0.01			-0.01			0.31		
	0.01			-0.01			0.01			0.01			0.01			0.31		
	0.01			-0.01			0.01			0.01			0.01			0.31		
	0.01			-0.01			0.01			0.01			0.01			0.31		
	0.01			-0.01			0.01			0.01			0.01			0.31		
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	0.01			-0.01			0.01											

XRF ANALYSIS RESULTS

**KELLEY
PA NO. 34-113**

Mine Name: Kelley PA No. 34-113
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
34-113-WR1A			11773	14640	3571.3	5362.8	61272	956.2 *	956.2 *	702.81	262.81		
34-113-WR1B			9930.7	12184	3992.5	5056.7	76405	1247.3 *	1247.3 *	901.2	206.92 *		
34-113-WR1C			10425	26402	5256.1	3024.5	54837	712.83 *	712.83 *	215.68 *	134.52 *		
34-113-WR1-COMP	683.05 *		13637	19423	5544	4625.9	69299	888.24 *	888.24 *	627.32	189.9 *		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
34-113-WR1A	384.61		136.05		4427.7	42.019 *				682.93		24.32 *	
34-113-WR1B	224.93		84.903	11.658 *	959.18	34.957 *				527.43		14.411 *	
34-113-WR1C	518.03		90.304		122.55	27.022 *				1030.8	147.86 *	22.456 *	
34-113-WR1-COMP	530.43		155.68		2440.7	39.106 *				798.26	170.99 *	21.58 *	

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**KELLEY
PA NO. 34-113**

AIMSS SCORESHEET

SITE NAME:

KELLY

PA NUMBER:

34-113

LINE
NO.

NO. 1		<u>GROUNDWATER PATHWAY</u>		
2		OBSERVED RELEASE		0
3A	GW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
3B		CONTAINMENT		20
3C		GW DEPTH		10
4		POTENTIAL TO RELEASE	LINES 3A x 3B	200
5		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
6	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.933
7	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
8		WELLS - 1 TO 4 MI		0
9		NEAREST WELL		0
10		TARGETS SCORE	LINES 6 + 7 + 8	0.0
		<u>GROUNDWATER SCORE</u>	LINES 4 x 5 x 9	0
NO. 11		<u>SURFACE WATER PATHWAY</u>		
12	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
13A		EXCEEDENCES		0
13B		CONTAINMENT		20
13C		DISTANCE TO SW		10
14		POTENTIAL TO RELEASE	LINES 13A x 13B	200
15		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	200
16	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.021
17	SW - TARGETS	DRINKING WATER POP'N		0
18		IMPACTED DRAINAGE		0
19		WETLANDS		10
20		FISHERY		0
21		RECREATION		5
22		IRRIGATION/STOCK		0
23		T & E SPECIES HABITAT		0
24		TARGETS SCORE	SUM LINES 16 THRU 22	15
		<u>SURFACE WATER SCORE</u>	LINES 14 x 15 x 23	3063
25		<u>AIR PATHWAY</u>		
26A	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26B		CONTAINMENT		15
26C		DISTANCE TO POPULATION		5
27		POTENTIAL TO RELEASE	LINES 26A x 26B	75
28		LIKELIHOOD SCORE	LINES 25 + 26C	75
29	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.034
30	AIR - TARGETS	POPULATION - 4 MILES		1
31		NEAREST RESIDENCE		0
32		WETLANDS		0
33		PARKS / WILDERNESS		0
34		T & E SPECIES HABITAT		0
35		TARGETS SCORE	SUM LINES 29 THRU 33	1
		<u>AIR PATHWAY SCORE</u>	LINES 27 x 28 x 34	3
36		<u>DIRECT CONTACT PATHWAY</u>		
37A	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		0
37B		ACCESSIBILITY		20
37C		DISTANCE TO POPULATION		5
38		POTENTIAL EXPOSURE	LINES 37A x 37B	100
39		LIKELIHOOD SCORE	LINES 36 + 37C	100
40	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.031
41	DIRECT CONTACT	POPULATION - 1 MILE		1
42	TARGETS	NEAREST RESIDENCE		0
43		RECREATIONAL USE		0
44		TARGETS SCORE	SUM LINES 40 THRU 42	1
		<u>DIRECT CONTACT SCORE</u>	LINES 38 x 39 x 43	3
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000			0.03

LINE NO.			SITE NAME:	KELLY
			PA NUMBER:	34-113
		SITE SAFETY		
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVE HAZARD		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	50
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	1
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	1.00



34-113, #12: WR-1 from top

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: STEMWINDER (SOUTH) PA#: 34-500

Date: October 6, 1995 Time: 1030-1230

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: Tim Pfahler, MDEQ Helicopter Pilot
Ben Quiñones, MDEQ/AMRB

Weather/Seasonality Observations: Cold; sunny; breezy; 8" of snow
on ground.

Photographic Log (Photo No.'s/Video Tape Number): #8: Open adit with
discharge (AD-1 sample location); #9: WR-1. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Small site; adit discharges to creek; HMO not previously
inventoried.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Route
discharge around dump. Move dump material out of stream.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): STEMWINDER (SOUTH) PA#: 34-500

Legal Description: T 3N ; R 11E ; Sec. 1 , SE 1/4 SE 1/4 1/4

County: PARK Mining District: BIG TIMBER CANYON

Latitude: N 46° 01' 50" Longitude: W 110° 17' 32"

Primary Drainage Basin and Code: Big Timber Creek/10070002

Secondary Drainage Basin: Blue Lake

USGS Quadrangle map name(s): Crazy Peak

Mine Type/Commodities: Hardrock/Silver-lead

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): Gallatin National Forest and unpatented claims

Relationship to other mines/sites in the area/district: 1/2 mile south of Kelley Mine; 1 mile south of Stenwinder Mine.

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? Unknown

General site features: Elevation 8300' , Slope 40° , Aspect West

Land use: Mining , Recreational X , Residential , Urban , Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 0.1 acre(s) .

Site Dimensions: 75 feet x 50 feet

Predominant vegetation types: Subalpine fir, willows

Access: roads - good (paved) , poor (maintained dirt road) , 4wd , trail X .

Other logistical considerations (proximity to other sites). Near Kelley Mine; on trail approximately 3 miles from trailhead at campground.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Mineralization occurs as a vein in a shear zone within diorite. Mine lies on unnamed tributary to Granite Lake. Water flows north away from the mine 1/8 mile into Granite Lake. Water flows out of the south end of Granite Lake east via an unnamed tributary into Blue Lake approximately 1/2 mile downstream. Water flows east through Blue Lake and Thunder Lake and exits on the northeast side of Thunder Lake. Water flows northeast 1/2 mile to confluence with Big Timber Creek, which flows east.

Mining/milling history, ore type/tenor, host rock, gangue: Discovered and worked around 1900. Small shipment of ore in 1929 to the ASARCO smelter. Dormant since 1929. Ore occurs in mineralized fissure within coarse-grained diorite. Ore contains anglesite, galena, and pyrite with minor bornite and quartz gangue. Gold, 0.16 oz/ton, silver, 28 oz/ton, and lead, 50%.

Mine Operation?

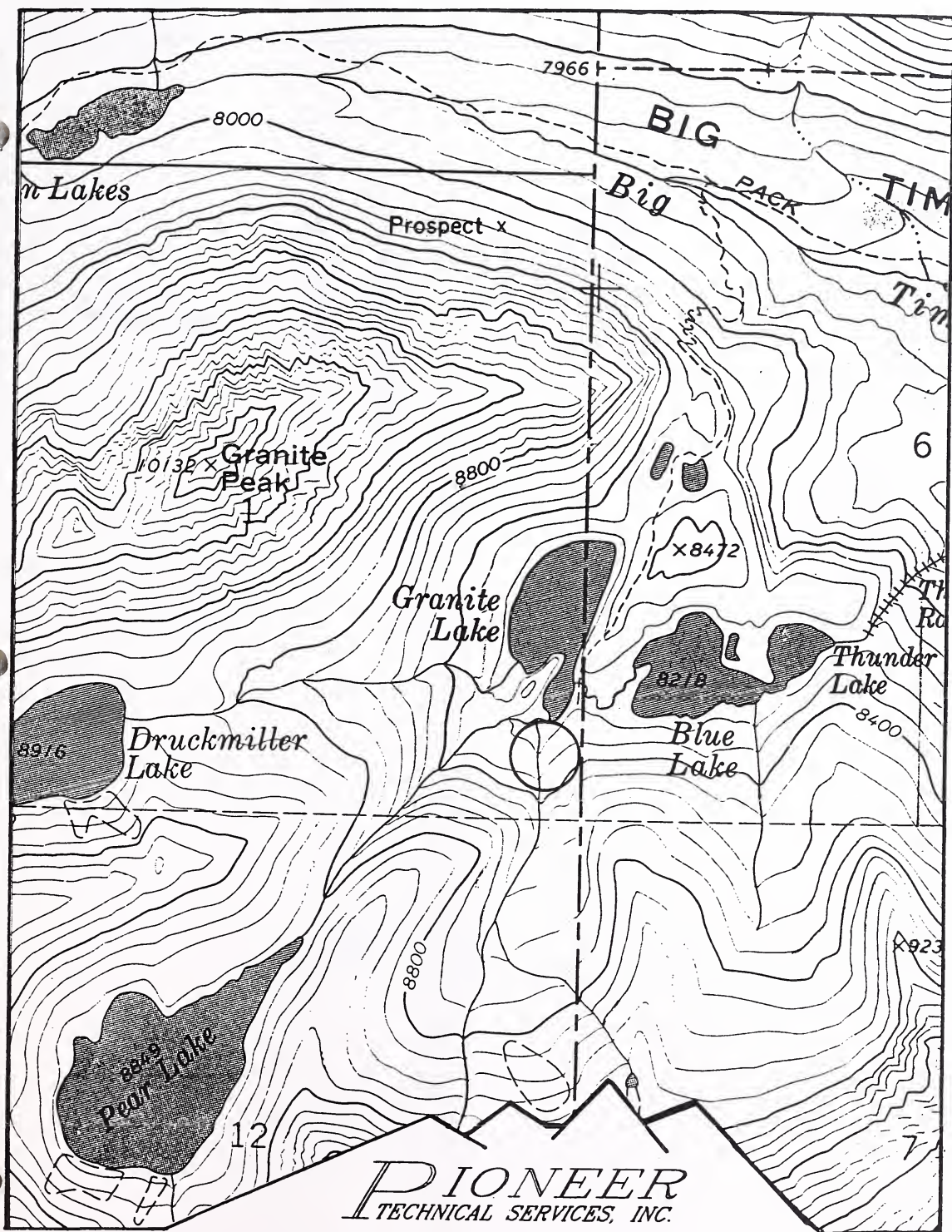
Shafts - Yes___, No X, # , Comment
Adits - Yes X, No___, # 1, Comment Open, discharging
Pits - Yes___, No X, # , Comment
Placers - Yes___, No X, # , Comment
Other - Yes___, No X, # , Comment

Mill Operation? Yes___, No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: N/A

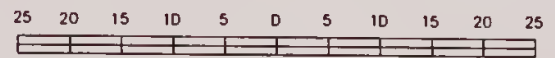
Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting? N/A



STEMWINDER (SOUTH), P.A. NO. 34-500

T03N. R11E. SECTION 01

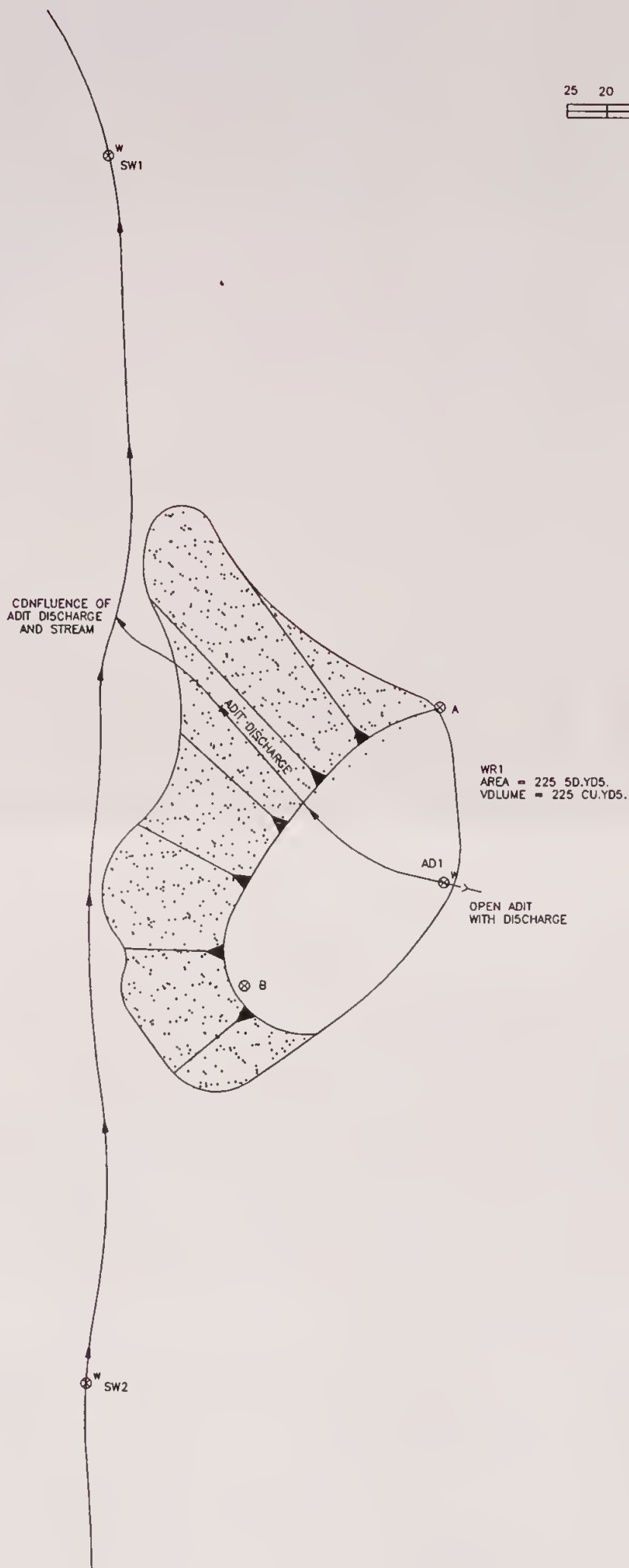
SCALE. 1" = 1000'



SCALE IN FEET



SCALE IN METERS



LEGEND

- XRF SAMPLE
- WATER SAMPLE GROUND AND SURFACE
- OPEN ADIT
- COLLAPSED ADIT
- DRAINAGE
- DRY DRAINAGE
- SLOPE DIRECTION
- WASTE ROCK DUMP OR TAILINGS PILE

GPS FILE CREATED 10/6/95

DRAWN FDR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 69702

TITLE:

STEMWINDER MINE
PA# 34-500

DRAWING NO.: PT342117

DATE: 3/7/96

PLDT SCALE: 1 = 5

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Tuesday

[illegible]

pH readings were taken directly on-site (Kelway Meter).

Comments or deviations from SOPs: 34-500-WR-1 is a composite of WR-1A and -1B. Background sample was collected at the Poorman/Emma site (49-001-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes , No X;

Number of well logs:

Distance to nearest well used for drinking:

 < 1,000 ft; 1,000 ft to 0.5 miles; X > 0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Moderate pH; low metals

Approximate Depth to Groundwater: < 25 ft; X 25 - 100 ft; > 100 ft.

Other observations/notes: Water comes from < 100 feet inside adit,
according to the map by Bailey.

SAMPLERS: Tuesday, Flammang

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Unnamed tributary of Big Timber Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Adit discharge to tributary

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1

Approximate Flood frequency? 1 yr, X 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0.025 cfs

High Flow: 0.2 cfs, Average Flow: 0.03 cfs

Distance between waste source(s) and nearest surface water body (ft)? 25 feet

Surface water draining onto or through waste sources: Yes X, No , Describe: Adit discharge flows over WR-1 into creek.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetland, fishery, recreation, agriculture

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Tuesday, Flamman

SAMPLERS: Tuesday, Flamman

[illegible]

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? None, steep canyon

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 X; 10-30___; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments Ranch

Nearest residence: ___<1,000 ft; ___1,000 ft - 0.5 miles; X>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FeOx	Dry	2,025	1,620	No	Low
AD-1	FeOx	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe: _____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments _____

Evidence of recreational use on site: Yes____, No X, Describe: _____
Although site lies near a recreational trail just above a lake.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs; _____ Moderately Accessible - barbed wire fences,
road gated, or signs posted; _____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____

Wilderness Area - Yes____, No X, Comment _____

T&E Species Habitat - Yes____, No____, Comment _____

Bat Habitat - Yes X, No____, Comment Possible open adit

Primary Drainage____; Secondary Drainage____; No Information X:

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - _____

Sport Fishery Classification - _____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Open adit

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations: _____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations: _____

Fire and/or Explosion hazards: Yes____, No X, Explain: _____

Bibliography

Bailey, Clive R., Economic Geology Evaluation of Big Timber Project, Park and Sweetgrass Counties, Montana, Report for Viking Exploration, Inc., October 1980.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

USGS, Topographic Map, Crazy Peak, Montana, 7 1/2 minute Quadrangle, 1972.

LABORATORY ANALYTICAL DATA

**STEMWINDER
PA NO. 34-500**

Stemwinder Mine PA# 34-500
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 10/6/95

SOLID MATRIX ANALYSES

FIELD ID	Metals in soil Results per dry weight basis																
	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-500-SE-1	6.6 UJX	22.5 J	276	1.9	5350	21.3 J	17.4 J	80.9 J	21300	755 J	7880	647	0.037 UJ	20.1 JX	0.93 U	61.5	NR
34-500-SE-2	7.5 UJX	6.5 J	140	1.4	3070	24.9 J	12.8 J	13.8 J	14400	21.2 J	6150	312	0.037 UJ	28.7 JX	1.1 U	40.9	NR
34-500-WR-1	5.4 UJX	55.7 J	289	3.6	8360	21.6 J	22.7 J	610 J	34200	6480 J	7750	1940	0.34 J	22.0 JX	17.7	143	NR
BACKGROUND	7.97 UJ	16.3	78.3 J	0.68 J	NR	45.6	13.5	40.1 J	28500	37.2	NR	612	0.00378	24	NR	99	NR
Acid/Base Accounting																	
				Tot. Sulfur		Pyritic Sulfur		Pyritic Sulfur		Pyritic Sulfur		Pyritic Sulfur		Pyritic Sulfur		Pyritic Sulfur	
				Acid Base	Sulfate	Acid Base	Sulfate	Acid Base	Sulfate	Acid Base	Sulfate	Acid Base	Sulfate	Acid Base	Sulfate	Acid Base	Sulfate
				Potential	%	Potential	%	Potential	%	Potential	%	Potential	%	Potential	%	Potential	%
FIELD ID	TOTAL SULFUR %	Neutral Potent. ug/100g		Acid Base ug/100g		Acid Base ug/100g		Acid Base ug/100g		Acid Base ug/100g		Acid Base ug/100g		Acid Base ug/100g		Acid Base ug/100g	
34-500-WR-1	0.21	6.56	17.1	10.6	0.04	0.01	0.16	0.31	16.80	16.80	35.28	6.25	13.56	28.48			

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

WATER MATRIX ANALYSES

FIELD ID	Metals in Water Results in ug/l																
	Sb (ug/L)	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Ca (ug/L)	Cr (ug/L)	Co (ug/L)	Cu (ug/L)	Fe (ug/L)	Pb (ug/L)	Mg (ug/L)	Mn (ug/L)	Hg (ug/L)	Ni (ug/L)	Ag (ug/L)	Zn (ug/L)	HARDNESS (mg CaCO ₃ /L)
34-500-SW-1	1.9 U	1.5 U	5.3	0.046 U	6020	8.7 U	8.3 U	2.0 J	19.1 J	1.2	395	3.4 UJ	0.26 JX	16.9 U	0.36 JX	9.1 U	16.7
34-500-SW-2	2.1	1.5 U	4.9	0.046 U	5590	8.7 U	8.3 U	2.7 J	14.2 UJ	0.93 U	382	3.4 UJ	0.19 JX	16.9 U	0.21 UJX	9.1 U	15.5
34-500-AD-1	3.4	1.5 U	3.7	0.046 U	8850	8.7 U	8.3 U	2.4 J	34.4 J	11.9	496	3.4 UJ	0.15 JX	16.9 U	0.69 JX	9.1 U	24.1
Wet Chemistry Results in mg/l																	
				Total Dissolved Solids		CHLORIDE		SULFATE		NO ₃ /NO ₂ -N		CYANIDE					
FIELD ID																	
34-500-SW-1	21	<	5	<	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
34-500-SW-2	17	<	5	<	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
34-500-AD-1	37	<	5	<	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

Legend

SE-1- 50 feet downstream of mine in tributary.
 SE-2- 50 feet upstream of mine in tributary.
 WR-1- Composite of WR1A & WR1B.
 BACKGROUND- Taken from Poor Mary Emma (49-001-SS1) (1993 data).
 AD-1- Flowing adit at WR-1.
 SW-1- Same as SE-1.
 SW-2- Same as SE-2.

XRF ANALYSIS RESULTS

**STEMWINDER
PA NO. 34-500**

Mine Name: Sternwinder (South) PA No. 34-500
 XRF Field Analyses
 Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
34-500-WR1A			11187	16447	5953	2315.3	53335	868.93 *	190.78 *	684.94	237.09 *		
34-500-WR1B	544.41 *	16245	18414	5012.8		2936.3	58647	957.99 *	138.91 *	771.32	112 *		
34-500-WR1-COMP	539.94 *	14632	17637	5498.5		2733.9	58695	1254 *		901.07	359.32		
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
34-500-WR1A	598.84	160.67			3839.1	46.443 *				1043.8			26.505 *
34-500-WR1B	619.17	124.7			6131.1	59.76 *				946.6		192.72 *	22.549 *
34-500-WR1-COMP	696.91	178.27			5478.9	53.259 *				1104.4		150.78 *	21.044 *

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**STEMWINDER
PA NO. 34-500**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

STEMWINDER SOUTH
34-500

LINE NO.			
GROUNDWATER PATHWAY			
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.554
6	GW - TARGETS	WELLS - 1 MI. x 2.5	0.0
7		WELLS - 1 TO 4 MI	0
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 0.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 0
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 200
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 500
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.924
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 17
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 16354
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 50
27		LIKELIHOOD SCORE	LINES 25 + 26C 50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.074
29	AIR - TARGETS	POPULATION - 4 MILES	1
30		NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 1
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 4
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 100
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.067
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42 1
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 7
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		(LINES 10 + 24 + 35 + 44) / 100,000 0.16

SITE NAME: STEMWINDER SOUTH
 PA NUMBER: 34-500

LINE NO.	THREAT	SITE SAFETY	
1		ACCESSIBILITY	20
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	0
5		HAZ. STRUCTURES 40 EA.	0
6		EXPLOSIVE HAZARD	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	50
9		POPULATION - 1 MILE	1
10	TARGETS	NEAREST RESIDENCE	0
11		RECREATIONAL USE	0
12		TARGETS SCORE SUM LINES 9 THRU 11	1
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	1.00



34-500, #8: Open discharging aquifer sample location

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: EMMA DARLING PA#: 39-027

Date: September 16, 1995 Time: 1300-1630

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: None

Weather/Seasonality Observations: Warm; breezy; recent rain.

Photographic Log (Photo No.'s/Video Tape Number): #24: Open pit at WR-4
(HMO); #25: WR-1 from base (south); #26: WR-1 from west; #1: WR-
2 from southwest; #2: WR-3 from south; #3: Fenced, open shaft at
WR-3. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is very dry and well above drainage. Horseback riders
observed near the site during investigation. Shooting going on
nearby. Cattle present on-site.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Grade, cover,
and revegetate dumps. Close and fill shafts.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): EMMA DARLING PA#: 39-027

Legal Description: T 7N ; R 8W ; Sec. 2 , SW 1/4 NE 1/4 1/4

County: POWELL Mining District: EMERY

Latitude: N 46° 23' 03" Longitude: W 112° 34' 12"

Primary Drainage Basin and Code: Clark Fork River/17010201

Secondary Drainage Basin: Rocker Gulch/Cottonwood Creek

USGS Quadrangle map name(s): Baggs Creek

Mine Type/Commodities: Hardrock/Lead, Silver

Activity Status: Active, Inactive/Exploration, Abandoned X.

Ownership status: Known Y X N; private/public? Public/Private
Owner, Agent, or Contact (Include address and phone when available): Mainly on claim (#9479) held by Montana Precision Mining; small part of WR-3 on USFS land. Claim corners identified on-site during investigation may cover unclaimed ground.

Relationship to other mines/sites in the area/district: 1/2 mile north of Emery Mines; 1/4 mile east of Hidden Hand

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Open shaft has been fenced by AMRB.

General site features: Elevation 6740', Slope 0-5°, Aspect South

Land use: Mining X, Recreational X, Residential, Urban, Agricultural X, Other(Specify) _____

Area of disturbed/unvegetated lands? 1 acre(s).

Site Dimensions: 500 feet x 250 feet

Predominant vegetation types: Grass, sagebrush, fir, aspen

Access: roads - good (paved)____, poor (maintained dirt road)____, 4wd X, trail____.

Other logistical considerations (proximity to other sites). Near Emery and Hidden Hand

Well logs within 1 mile radius; (Attach MRMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). District is underlain by andesite of probable late Cretaceous age that consists of flows, tuffs, and breccias. Site lies on hillside well above drainage. Water leaving site would flow 1/4 mile southwest into unnamed tributary of Rocker Gulch. Unnamed tributary of Rocker Gulch flows south into Rocker Gulch approximately 3/4 mile below the site. Rocker Gulch flows southwest 1.25 miles to confluence with Cottonwood Creek, which flows west to confluence with the Clark Fork River approximately 12.5 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: Mine produced lead-silver ores. Production occurred in 1910, 1916, and 1924.

Mine Operation?

Shafts - Yes X, No , # 3, Comment 1 open and fenced

Adits - Yes , No X, # , Comment

Pits - Yes X, No , # 1, Comment 15' x 15' x 25'

Placers - Yes , No X, # , Comment

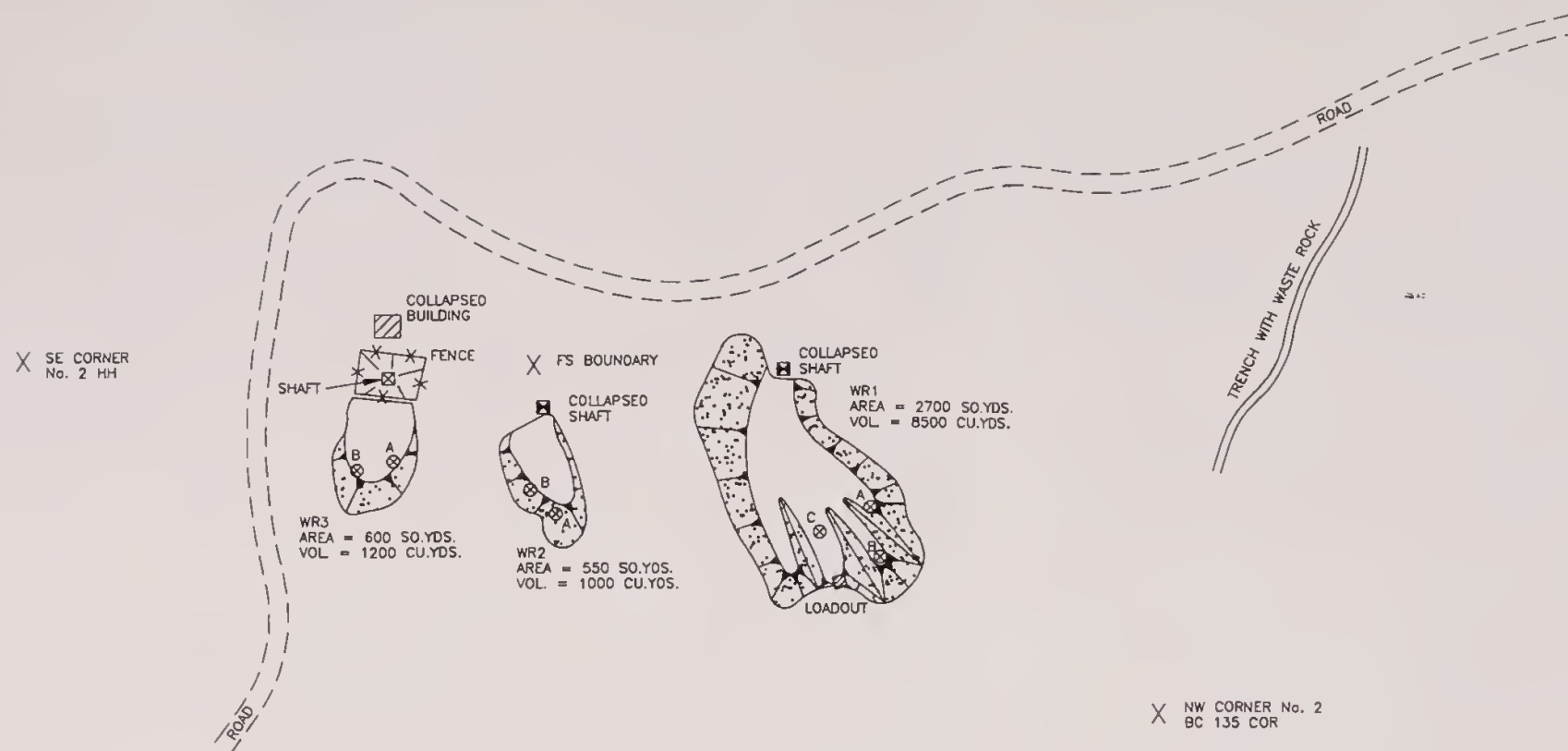
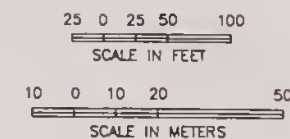
Other - Yes X, No , # 1, Comment Trench

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

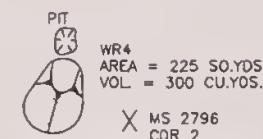
Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A



LEGEND

- | | | | |
|-------|-----------------|-------|-------------------------------------|
| ⊗ | XRF SAMPLE | == | IMPROVED ROAD |
| ⊠ | OPEN SHAFT | - - - | UNIMPROVED ROAD |
| ⊡ | COLLAPSED SHAFT | ⬇ | EXCAVATION |
| → | DRAINAGE | ▲ | SLOPE DIRECTION |
| - - - | DRY DRAINAGE | ⬆ | WASTE ROCK DUMP
OR TAILINGS PILE |
| - x - | FENCE | | |



GPS FILE CREATED 9/16/95

DRAWN FOR: PIONEER TECHNICAL SERVICES, INC. P.O. BOX 3445 BUTTE, MT 59702	TITLE: EMMA DARLING MINE PA# 39-027
	DRAWING NO.: PT342101 DATE: 1/29/96 PLOT SCALE: 1 = 40

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

R J SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Flammang

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1A	WR	8,500	Eastern dump; east lobe	None	6.0	0.04	39-027-WR-1	09/17/95 1100	T-Metals, ABA
WR-1B	WR		Eastern dump; center lobe	None	5.4	0.05			
WR-1C	WR		Eastern dump; west lobe	None	6.6	0.05			
WR-2A	WR	1,000	Middle dump; south side	None	5.6	0.05			
WR-2B	WR		Middle dump; west side	None	6.5	0.04			
WR-3A	WR	1,200	Western dump; east side	None	5.4	0.04			
WR-3B	WR		Western dump; west side	None	3.6	0.05			

* pH readings were taken directly on-site (Salway Meter).

Comments or deviations from SOPs: 39-027-WR-1 is a composite of WR-1A through -1C, WR-2A and -2B, and WR-3A and -3B. Background sample was collected at the Emery Mine (39-004-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:___

Filled shafts: Yes___, No X, Number:___ Identification:___

Seeps/Springs: Yes___, No X, Number:___ Identification:___

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 10

Distance to nearest well used for drinking:

___<1,000 ft;___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible___, Unlikely X.

Deep groundwater; sources on top of ridge

Approximate Depth to Groundwater:___<25 ft;___ 25 - 100 ft; X >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, abct, eep or eprng?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes X, No____, Name(s): Beginning of Rocker Gulch

Other surface water: Yes____, No X, Name(s)/Description: _____

Waste materials within any floodplain: Yes____, No X Source ID(s): _____

Approximate Flood frequency? ____1 yr, ____10 yr, ____100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)? 500 feet

Surface water draining onto or through waste sources: Yes____, No X, Describe: _____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Agriculture, wetlands, irrigation; Clark Fork River has fishery and recreation.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): _____

SAMPLERS:

[illegible]

FLOW: Estimated (K) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 20 acres on top of divide

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Tuesday, Flammand

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X, Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____; 300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____; Comments Residences at Emery and Hidden Hand Mines

Evidence of recreational use on site: Yes X, No____, Describe:_____
Shooting; litter

Accessibility (check each that apply): Easy accessible - no fences, gates, or warning signs; X Moderately Accessible - barbed wire fences, road gated, or signs posted; Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle

Bat Habitat - Yes X, No____, Comment Open shaft

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 2, types and locations:_____
One shaft (fenced and in good repair) by WR-3; one pit unfenced by WR-4

Hazardous structures: Yes X, No____, Number 1, types and locations:_____
Loadout at WR-1

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____, types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X, Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Geology and Mineral Deposits of the Zosell (Emery) Mining District, Powell County, Montana, Memoir 34, Written by Forbes Robertson, 1953.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Portal Inventory Form for Emma Darling, Prepared by Daphne Digrindakis, August 5, 1986.

USGS, Topographic Map, Baggs Creek, Montana, 7 1/2 minute Quadrangle, 1989.

LABORATORY ANALYTICAL DATA

**EMMA DARLING
PA NO. 39-027**

Emma Darling PA# 39-027
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/16/95

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Sh (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Ca (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)	CYANIDE (mg/kg)
39-027-WR-1	126 J	5140	130	44.5	17800	20.5	25.9	239 J	78500	2230 J	8250	2200	1.1	10.0	101	2020 J	NR
BACKGROUND	7 UJ	91	295	3.5	NR	36.9	13.9	67.3	43400	43	NR	2960	0.165	7	NR	171	NR
Acid/Base Accounting																	
Pyritic Sulfur																	
Tot. Sulfur																	
Sulfate Sulfur																	
Acid Base Potential																	
Neutral Potent.																	
TOTAL SULFUR																	
%																	
39-027-WR-1	3.40	106	149	43.0	<0.01	1.63	2.42	50.9	98.30	98.30	206.43	126.56	28.05	58.90			
Lime Req. Dolphoff (lbs.) 1ft.																	
Lime Req. Dolphoff (lbs.) 1ft.																	
Potential Acidity																	

Legend

WR-1: Composite WR1A, 1B, 1C, 2A, 2B, 3A, 3B
BACKGROUND: From the Emery mine (39-004-SS1) (1993 data)

XRF ANALYSIS RESULTS

**EMMA DARLING
PA NO. 39-027**

(11

5)

(1

Mine Name: Emma Darling PA No. 39.027
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
39-027-WR1A		17509	31596	1156.3		3934.6	45025	433.25 *		195.09 *	6123.7	2988	35.869 *
39-027-WR1B		13655	33064	1422.4		1803.8	41109	754 *		181.02 *	3072.4	1942.7	36.203 *
39-027-WR1C		23565	31284	1841.6		3539.9	41145	713.03 *		79.641 *	2330.5	3073	32.854 *
39-027-WR2A		20505	3905.4	2194.6		4490.7	56646	1016.5 *		85.567 *	2801.7	1737.3	43.295 *
39-027-WR2B		19219	5290.7	1460.4		3380.7	81535	1333.1 *		202.99 *	699.79	7006.8	62.107 *
39-027-WR3A		16766	23427	1618		6159.9	58100	988.18 *			2346.1	1054.8	24.231 *
39-027-WR3B		20568	2637	1904.6		890.92 *	74392	735.09 *			602.6	801.49	
39-027-WR1-COMP		20919	20603	1779.3		3160.2	59737	818.03 *		115.74 *	2562.9	2428	
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
39-027-WR1A	308.26	131.73			1316	97.948	167.03 *			281.59	405.6	214.32 *	
39-027-WR1B	456	123.12			1061.3	47.053 *				83.228 *	686.29	136.93 *	
39-027-WR1C	355.55	126.19			789.18	97.891	183.4 *				397.28		
39-027-WR2A	177.68	159.54			1011.2	82.328					432.85		
39-027-WR2B	419.72	148.02			3631	119.75				364.77	402.4	243.03 *	
39-027-WR3A	275.17	128.34			197.52	76.751					330.42		
39-027-WR3B	184.6	150.98			2032.2	99.665					484.27	130.32 *	
39-027-WR1-COMP	489.91	149.16			1907	111.88				202.21 *	570.82		

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**EMMA DARLING
PA NO. 39-027**

17

18

19

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

EMMA DARLING
39-027

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	20
3B	OF RELEASE	GW DEPTH	2
3C		POTENTIAL TO RELEASE	40
4		LIKELIHOOD SCORE	40
5	GW - WASTE CHAR.	CALCULATED SCORE	73.988
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	10
8		NEAREST WELL	0
9		TARGETS SCORE	10.0
10		GROUNDWATER SCORE	29595
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD	CONTAINMENT	20
13B	OF RELEASE	DISTANCE TO SW	2
13C		POTENTIAL TO RELEASE	40
14		LIKELIHOOD SCORE	40
15	SW - WASTE CHAR.	CALCULATED SCORE	76.662
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	23
24		SURFACE WATER SCORE	70529
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD	CONTAINMENT	15
26B	OF RELEASE	DISTANCE TO POPULATION	10
26C		POTENTIAL TO RELEASE	150
27		LIKELIHOOD SCORE	150
28	AIR - WASTE CHAR.	CALCULATED SCORE	0.767
29		POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	5
31	AIR - TARGETS	WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	30
35		AIR PATHWAY SCORE	3452
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF	ACCESSIBILITY	20
37B	EXPOSURE	DISTANCE TO POPULATION	10
37C		POTENTIAL EXPOSURE	200
38		LIKELIHOOD SCORE	250
39	D. C. WASTE CHAR.	CALCULATED SCORE	0.740
40	DIRECT CONTACT	POPULATION - 1 MILE	1
41	TARGETS	NEAREST RESIDENCE	5
42		RECREATIONAL USE	10
43		TARGETS SCORE	16
44		DIRECT CONTACT SCORE	2960
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		1.07
	(LINES 10 + 24 + 35 + 44) / 100,000		

LINE
NO.

SITE NAME:
PA NUMBER:

EMMA DARLING
39-027

SITE SAFETY

1	THREAT	ACCESSIBILITY		2
2		OPEN SHAFTS	100 EA.	200
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVE HAZARD		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	240
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	16
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	76.80



39-027, #1: WR-3 from south



39-027, #2: Fenced open shaft at WR-3



39-027, #3: WR-3 from base (south)



39-027, #4: WR-3 from base (south)

2100 10 3005 3000 30

1100 10 3005 3000 30

1100 10 3005 3000 30



39-027, #26: WR-1 from west

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: BONANZA PA#: 39-501

Date: September 16, 1995 Time: 1100-1300

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm; breezy.

Photographic Log (Photo No.'s/Video Tape Number): #19: Open incline HMO; #20: WR-1 and lower loadout; #21: South part of WR-2 (WR-2A sample location) and upper loadout; #22: Middle part of WR-2 (WR-2B sample location) and both loadouts; #23: North part of WR-2 (WR-2C sample location). Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Revegetate waste rock dumps. Close HMO.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): BONANZA PA#: 39-501

Legal Description: T 7N ; R 8W ; Sec. 11 , NE 1/4 NW 1/4 1/4

County: POWELL Mining District: EMERY

Latitude: N 46° 22' 45" Longitude: W 112° 34' 12"

Primary Drainage Basin and Code: Clark Fork River/17010201

Secondary Drainage Basin: Rocker Gulch/Cottonwood Creek

USGS Quadrangle map name(s): Baggs Creek

Mine Type/Commodities: Hardrock/Gold, Lead, Silver

Activity Status: Active___, Inactive/Exploration___, Abandoned X .

Ownership status: Known Y X N___; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Montana

Precision Mining (claim no. 9561)

Relationship to other mines/sites in the area/district: 1/2 mile northeast of Emery; 1/2 mile south of Hidden Hand and Emma Darling.

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? Unknown, recent exploration work

General site features: Elevation 6500' , Slope 10-20° , Aspect South

Land use: Mining X , Recreational X , Residential___, Urban___, Agricultural X , Other (Specify)___

Area of disturbed/unvegetated lands? 1 acre(s) .

Site Dimensions: 350 feet x 300 feet

Predominant vegetation types: Grass, sage, fir

Access: roads - good (paved)___, poor (maintained dirt road)___, 4wd X , trail___.

Other logistical considerations (proximity to other sites). Near Emery and Hidden Hand Mines

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Site lies to the east and above Rocker
Gulch. Water leaving the site would flow south or west into Rocker
Gulch. Rocker Gulch flows southwest 1.25 miles to confluence with
Cottonwood Creek, which then flows west to confluence with Clark
Fork River approximately 12.5 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: _____
Production is reported for the Bonanza in 1911, 1917, 1924, 1925,
1926, and 1927. The incline shaft was sunk to 284 feet in 1926 and
several car loads of gold ore, containing lead and silver were
shipped.

Mine Operation?

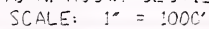
Shafts - Yes____, No X, # _____, Comment _____
Adits - Yes X, No____, # 1, Comment Open incline
Pits - Yes____, No X, # _____, Comment _____
Placers - Yes____, No X, # _____, Comment _____
Other - Yes____, No X, # _____, Comment _____

Mill Operation? Yes____, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill____ Dedicated Mill____; Number and
names of mines that supplied mill feed: N/A

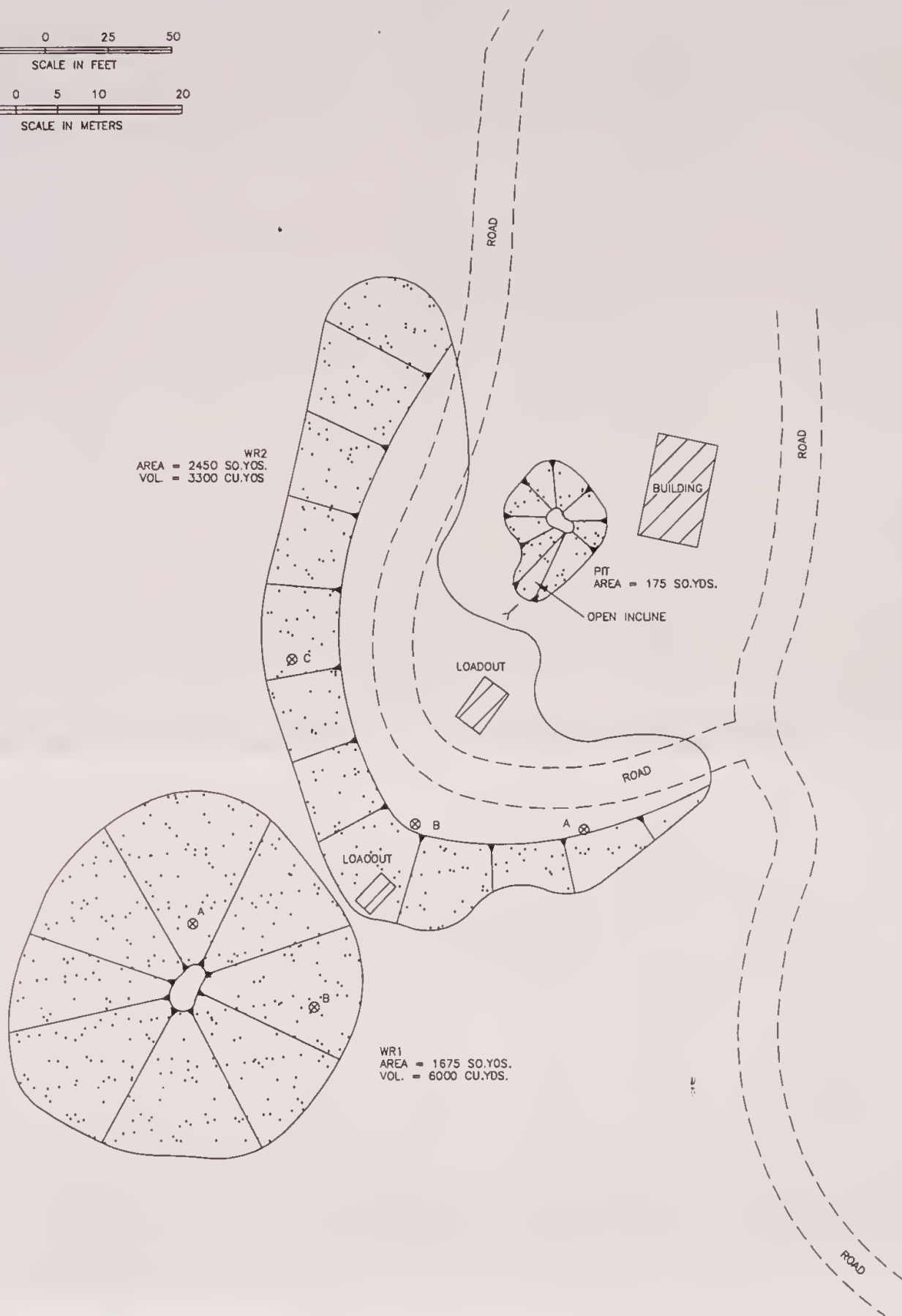
Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A





25 0 25 50
SCALE IN FEET

5 0 5 10 20
SCALE IN METERS



LEGEND

- ⊗ XRF SAMPLE
- IMPROVED ROAD
- - - UNIMPROVED ROAD
- ▨ STRUCTURE
- ↑ SLOPE DIRECTION
- WASTE ROCK DUMP OR TAILINGS PILE

GPS FILE CREATED 9/16/95

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 59702

TITLE:

BONANZA MINE
PA# 39-501

DRAWING NO.: PT342102

DATE: 1/29/96

PLOT SCALE: 1" = 15'



II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A



SAMPLERS: Tuesday

[illegible]

. pH readings were taken directly on-site (Kelvey Meter).

MDEQ/AMRB-PIONEER 01/12/96

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X, Number:____ Identification:_____

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes X, No____;

Number of well logs: 10

Distance to nearest well used for drinking:

____<1,000 ft; ____1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable____, Possible____, Unlikely X.

Moderate pH; sources on ridge line; deeper groundwater.

Approximate Depth to Groundwater: ____<25 ft; X 25 - 100 ft; ____ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

ALOW: Estimated (E) or Measured (M) from edit, shaft, need or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes X, No____, Name(s): Rocker Gulch

Other surface water: Yes____, No X, Name(s)/Description: _____

Waste materials within any floodplain: Yes____, No X Source ID(s): _____

Approximate Flood frequency? ____1 yr, ____10 yr, ____100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)?

300 feet

Surface water draining onto or through waste sources: Yes____, No X, Describe: _____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Agriculture, fishery, wetlands, irrigation, and recreation

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): _____

SAMPLERS:

[illegible]

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 3 acres around and downhill from the mine

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

SAMPLERS: Tuesday

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Residents at Emery and Hidden Hand Mines

Evidence of recreational use on site: Yes X, No____, Describe:_____
Camp remains; shooting

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle

Bat Habitat - Yes X, No____, Comment Open incline

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Open incline

Hazardous structures: Yes X, No____, Number 4, types and locations:____
2 buildings and 2 loadouts

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 1, types and locations: WR-1 is steep and at angle of repose.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Geology and Mineral Deposits of the Zosell (Emery) Mining District, Powell County, Montana, Memoir 34, Written by Forbes Robertson, 1953.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.

USGS, Topographic Map, Baggs Creek, Montana, 7 1/2 minute Quadrangle, 1989.



LABORATORY ANALYTICAL DATA

BONANZA

PA NO. 39-501

Bonanza Mine PA# 39-501
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/16/95

SOLID MATRIX ANALYSES																		
FIELD ID	Metals in soils Results per dry weight basis																	
	Sb (mg/Kg)	As (mg/Kg)	Ba (mg/Ks)	Cd (mg/Kg)	Ca (mg/Kg)	Cr (mg/Kg)	Co (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Pb (mg/Kg)	Mg (mg/Kg)	Mn (mg/Kg)	Hg (mg/Kg)	Ni (mg/Kg)	Ag (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)	
39-501-WR-1	13.3 J	8350	17.4	38.0	44200	10.9	14.5	62.6 J	49100	4120 J	17300	4400	0.69	15.8	28.1	4390 J	NR	
BACKGROUND	7 UJ	91	295	3.5	NR	36.9	13.9	67.3	43400	43	NR	2960	0.165	7	NR	171	NR	
U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested																		
AcidBase Accounting																		
FIELD ID	TOTAL SULFUR %		Neutral Potent		Tot. Sulfur Acid Base Potential		Pyritic Sulfur Acid Base Potential		Pyritic Sulfur Acid Base Potential		Lime Req. Sobek (lbs.)/Tn.		Potential Acidity (t/1000)		Lime Req. Dolthopt (t/1000)		Lime Req. Dolthopt (lbs.)/Tn.	
	%	t/1000	%	t/1000	%	t/1000	%	t/1000	%	t/1000	%	t/1000	%	t/1000	%	t/1000	%	t/1000
39-501-WR-1	5.00	156	138	-18.3	-18.3	59.7	78.20	78.20	78.20	78.20	164.22	170.31	-40.39	-84.82				

Legend

WR-1- Composite 1A, 1B, 2(1B), 2A, 2C
BACKGROUND- From the Emery Mine (39-004-SS1) (1993 data)

Legend

WR-1, Composite 1A, 1B, 2(1B), 2A, 2C
 BACKGROUND From the Emery Mine (39-004-SS1) (1993 data)

XRF ANALYSIS RESULTS

BONANZA
PA NO. 39-501

Mine Name: Bonanza PA No. 39-501
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
39-501-WR1A		20664	23825	1800.6		2363.2	40274	420.62 *			4401.3	5930.1	47.581 *
39-501-WR1B		20683	29803	1230.7		3008.3	36604				2919.9	3563.3	24.362 *
39-501-WR2A		21301	22252	1690		3054.3	45252	449.33 *			2702.7	6482.2	37.273 *
39-501-WR2B		21191	23098	1710.7		2975.6	38560	525.06 *			3332.3	7358.8	47.356 *
39-501-WR2C		14121	34442	1121		4831.7	66035	1248.3 *		165.37 *	8323.4	20502	73.357 *
39-501-WR1-COMP		19219	21509	1513.1		4336.4	46066	843.23 *		78.729 *	4684.5	9383.7	60.473 *
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
39-501-WR1A	195.71	117.28			2177.5		90.11				278.68		
39-501-WR1B	148.97	105.72			1422.4		93.014				209.07		
39-501-WR2A	127.33	132.4			1416.9		97.73				114.03 *		
39-501-WR2B	131.41	111.08			2028.1		85.495				154.24	121.53 *	
39-501-WR2C	81.287	117.17			8475.2		37.615 *		107.4 *		98.76	213.77 *	
39-501-WR1-COMP	111.87	114.75			3317		87.393				197.46	128.87 *	

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**BONANZA
PA NO. 39-501**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

BONANZA
39-501

LINE NO.				
GROUNDWATER PATHWAY				
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	37.145
6		WELLS - 1 MI. x 2.5		0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI		10
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	10.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9	74290
SURFACE WATER PATHWAY				
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	38.435
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18	SW - TARGETS	WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 THRU 22	23
24		SURFACE WATER SCORE	LINES 14 x 15 x 23	35360
AIR PATHWAY				
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		15
26B		DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	150
27		LIKELIHOOD SCORE	LINES 25 + 26C	150
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.281
29		POPULATION - 4 MILES		10
30	AIR - TARGETS	NEAREST RESIDENCE		5
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 THRU 33	30
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34	5765
DIRECT CONTACT PATHWAY				
36		OBSERVED EXPOSURE		50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	250
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.238
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		1
41		NEAREST RESIDENCE		5
42		RECREATIONAL USE		10
43		TARGETS SCORE	SUM LINES 40 THRU 42	16
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	4952
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE			
	(LINES 10 + 24 + 35 + 44) / 100,000			1.20

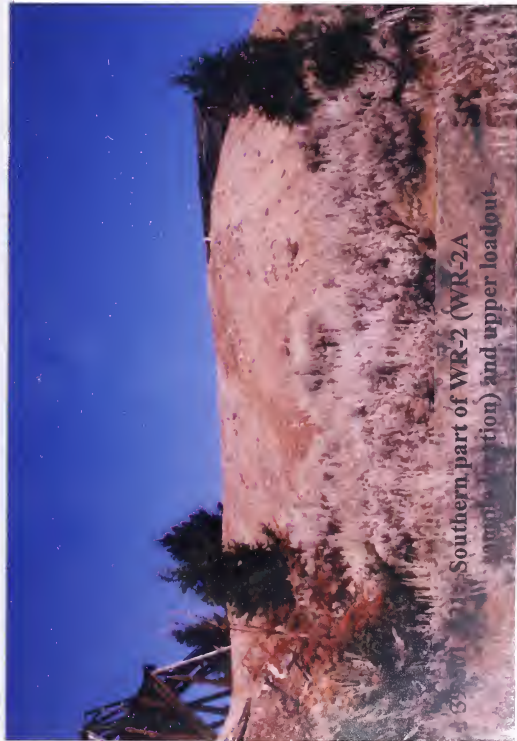
LINE NO.				SITE NAME:	BONANZA
				PA NUMBER:	39-501
		<u>SITE SAFETY</u>			
1	THREAT	ACCESSIBILITY			20
2		OPEN SHAFTS	100 EA.		0
3		OPEN ADITS	50 EA.		50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.		0
5		HAZ. STRUCTURES	40 EA.		160
6		EXPLOSIVE HAZARD			0
7		HAZ. MATERIALS			0
8		HAZARDS SCORE	SUM LINES 2 THRU 7		210
9		POPULATION - 1 MILE			1
10	TARGETS	NEAREST RESIDENCE			5
11		RECREATIONAL USE			10
12		TARGETS SCORE	SUM LINES 9 THRU 11		16
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000		67.20



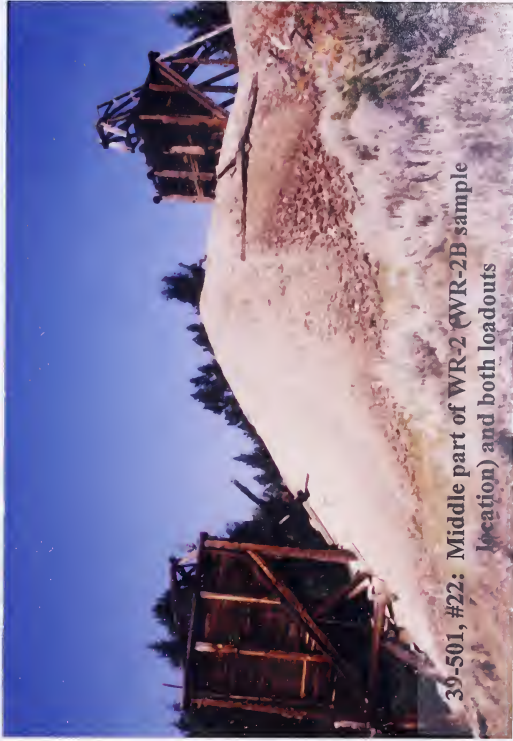
39-501, #19: Open incline HMO



20: WR-1 and lower loadout



39-501, #21: Southern part of WR-2 (WR-2A sample location) and upper loadout



39-501, #22: Middle part of WR-2 (WR-2B sample location) and both loadouts

Black Bay, Cape Cod

Black Bay, Cape Cod



01. #233 Northern part of WR-2
sample location

Black Bay, Cape Cod

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: HIDDEN HAND PA#: 39-502

Date: September 17, 1995 Time: 1100-1630

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: None

Weather/Seasonality Observations: Warm; sunny; recent rain.

Photographic Log (Photo No.'s/Video Tape Number): #4: West half of WR-1; #5: East half of WR-1; #6: South HMO at WR-1; #7: Middle south HMO at WR-1; #8: Middle north HMO at WR-1; #9: North HMO at WR-1; #10: WR-2 from north; #11: North half of WR-3 from above; #12: South half of WR-3 from above; #13: South part of WR-3 from road (north); #14: Open shaft near WR-3, looking down; #15: Spring and pond in drainage below WR-3; #16: East side of WR-4 (Note: Adit discharge water); #17: West side of WR-4 and loadout; #18: Adit discharge at WR-4 (AD-1 sample location). Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Signs of recent exploration activity. Site has 3 distinct areas: upper, middle, and lower. Upper north area has reopened adits; 5 adits are open, 4 are collapsed, and each has associated waste rock, some of which is very old and revegetated. No water on-site and far from surface water. Middle part of site lies in drainage, has 1 collapsed adit, 1 open pit, and a small seep at base of waste rock which cattle appear to utilize. The lower site is 1,000' below the middle site in the same drainage. Collapsed adit there is discharging; pond above and stream below waste rock.
Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Grade, cover, and revegetate upper waste rock dumps. Remove waste rock dumps from drainage and revegetate. Close HMOs. Fill open pit with waste rock, cover, and revegetate. May possibly require some form of water treatment at lower discharge.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): HIDDEN HAND PA#: 39-502

Legal Description: T 7N ; R 8W ; Sec. 3 , NE 1/4 SE 1/4 1/4

County: POWELL Mining District: EMERY

Latitude: N 46° 23' 28" Longitude: W 112° 33' 31"

Primary Drainage Basin and Code: Clark Fork River/17010201

Secondary Drainage Basin: Baggs Creek/Cottonwood Creek

USGS Quadrangle map name(s): Baggs Creek

Mine Type/Commodities: Hardrock/Gold

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): USFS;
unpatented claim corner near WR-1

Relationship to other mines/sites in the area/district: 1/4 mile
west of Emma Darling; 1/2 mile north of Emery

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown; recent exploration

General site features: Elevation 6400'-6600' , Slope 15°-30° ,
Aspect Southwest and South

Land use: Mining X , Recreational X , Residential X , Urban ,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 2 acre(s) .

Site Dimensions: 600 feet x 400 feet (upper); 350 feet x 200 feet
(middle); 300 feet x 200 feet (lower)

Predominant vegetation types: Spruce, fir; grass, sage on south
slopes

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites). Near
Emery, Bonanza, and Emma Darling

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no
well logs within a 1 mile radius. Water supply well(s) located at
the Emery site (39-004).

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Middle and lower site lie on unnamed
intermittent tributary to Baggs Creek. Water leaving the site
flows approximately 1 mile northwest to Baggs Creek, which flows
southwest to confluence with Cottonwood Creek approximately 3 miles
downgradient. Cottonwood Creek then flows west and southwest
approximately 4.5 miles to confluence with the Clark Fork River.
Site appears to be underlain by basalt porphyry.

Mining/milling history, ore type/tenor, host rock, gangue: _____
Produced in 1928, 1937, and 1950. In 1928, lead-silver ore shoot
was mined. In 1937, footwall of old vein was mined for gold. Ore
was confined to a brecciated shear zone which was cemented by
quartz. Host rock may have been a basalt porphyry, but difficult
to determine because alteration strongly bleached and silicified
the rock. Specimens from the dump of the lower tunnel which
contain sulfides from the unoxidized vein show arsenopyrite,
pyrite, sphalerite, galena, and traces of chalcopyrite. No
tetrahedrite has been identified.

Mine Operation?

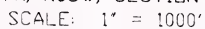
Shafts - Yes X, No , # 1, Comment Open, 25' deep
Adits - Yes X, No , # 10, Comment 4 open, 6 collapsed;
1 discharging
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and
names of mines that supplied mill feed: N/A

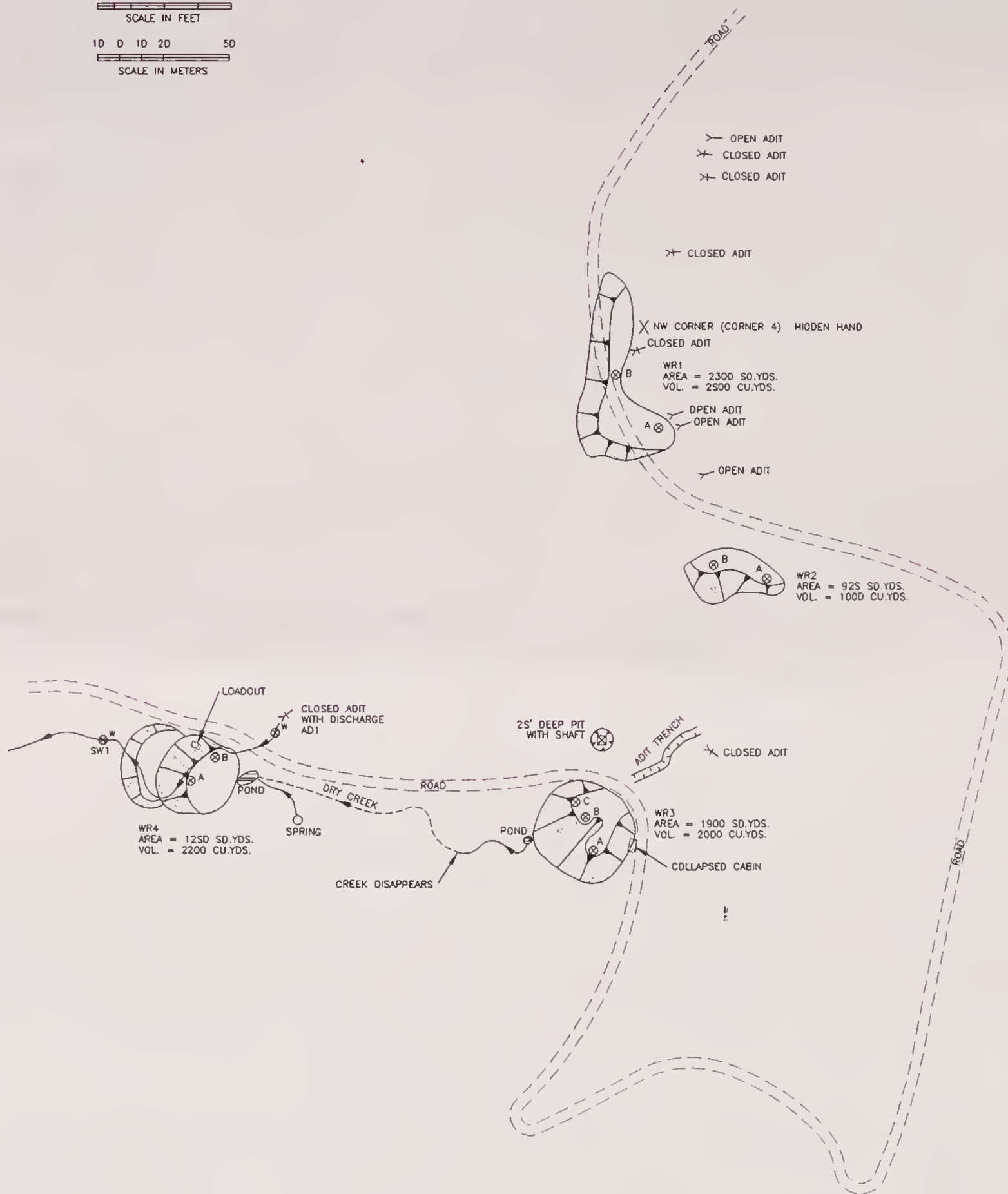
Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A





SD 0 50 100 150
SCALE IN FEET

10 0 10 20 50
SCALE IN METERS



LEGEND

- | | |
|--|------------------------------------|
| ⊗ XRF SAMPLE | ▨ STRUCTURE |
| ⊗ ^w WATER SAMPLE GROUND AND SURFACE | ▨ PONDING WATER |
| — OPEN ADIT | ▨ EXCAVATION |
| — COLLAPSED ADIT | ▨ SLOPE DIRECTION |
| — DRAINAGE | ▨ WASTE ROCK DUMP OR TAILINGS PILE |
| — DRY DRAINAGE | |
| — IMPROVED ROAD | |
| — UNIMPROVED ROAD | |

GPS FILE CREATED 9/17/95

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 59702

TITLE:

HIDDEN HAND MINE
PA# 39-502

DRAWING NO.: PT342103
DATE: 1/29/96

PLOT SCALE: 1" = 50'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Tuesday

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	pH SU (D/S)*	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	2,500	Upper dump (north); south end	None	6.6	0.04	39-502-WR-1	09/18/95 1100	T-Metals, ABA
WR-1B	WR		Upper dump (north); north end	None	6.8	0.05			
WR-2A	WR	1,000	Upper dump (south); east end	None	6.6	0.04			
WR-2B	WR		Upper dump (south); west end	None	4.0	0.04			
WR-3A	WR	2,000	Middle dump; south lobe	None	6.2	0.03	39-502-WR-2	09/18/95 1100	T-Metals, ABA
WR-3B	WR		Middle dump; middle lobe	None	5.6	0.03			
WR-3C	WR		Middle dump; north lobe	None	3.7	0.03			
WR-4A	WR	2,200	Lower dump; south side	None	4.6	0.03			
WR-4B	WR		Lower dump; north side, near loadout	None	3.6	0.04			

*pH readings were taken directly on-site (Kiloway Meter).

Comments or deviations from SOPs: 39-502-WR-1 is a composite of WR-1A, -1B, -2A, and -2B. 39-502-WR-2 is a composite of WR-3A through -3C, -4A, and -4B. Background sample was collected from the Emery Mine (39-004-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1 at WR-4

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 10

Distance to nearest well used for drinking:

 < 1,000 ft; 1,000 ft to 0.5 miles; X > 0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Low pH sources; high metals; in stream floodplain; shallow groundwater

Approximate Depth to Groundwater: X < 25 ft; 25 - 100 ft; > 100 ft.

Other observations/notes: Resident approximately 1/4 mile north from
upper site appears to haul in water.

SAMPLERS: Tuesday, Flamman

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, shaft, seep or spring?

Comments or Deviations from the SOPs *(Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Downstream from adit discharge in tributary of Baggs Creek

Dry streambeds: Yes X, No , Name(s): Above WR-4 in tributary of Baggs Creek

Other surface water: Yes X, No , Name(s)/Description: Pond above WR-4 in tributary collects run-off only; small seep at base of WR-3, cattle use. Both appear to be utilized for cattle.

Waste materials within any floodplain: Yes X, No Source ID(s): WR-3, WR-4

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0 (between WR-3 and WR-4) High Flow: 50 gpm, Average Flow: 8-10 gpm below WR-4

Distance between waste source(s) and nearest surface water body (ft)? 0 feet - seep at base of WR-3; 0 feet - pond and stream at base of WR-4

Surface water draining onto or through waste sources: Yes X, No , Describe: Adit discharge flows over and around WR-4.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Agriculture, wetland, irrigation; Clark Fork River has fishery, recreation, and wetlands.

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Tuesday, Flammand

4 (H) perneven zo (E) perwisse: MO7A

MDEQ/AMRB-PIONEER 01/12/96

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approximately 1 acre on hillside
for upper dumps; none for lower dumps

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Flammang

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FEOX	Dry	20,700	20,700	Yes	Moderate
WR-2	SO3; FEOX	Dry	8,325	8,325	Yes	Low
WR-3	SO3; FEOX; pH	Dry	17,100	8,550	Yes	Low
WR-4	FEOX; SO3; pH	Partial	11,250	3,375	Yes	Low
AD-1	FEOX	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Residence 1/4 mile north of upper site; residents at Emery
site approximately 1 mile to the south.

Evidence of recreational use on site: Yes X, No____, Describe:_____
Camp remains on WR-3

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than .0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes X, No____, Comment Bald Eagle
Bat Habitat - Yes____, No X, Comment Open adits

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____
Wetlands Frontage - High____, Medium X, Low____
Fisheries Habitat and Species Classification - 3
Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 5, types and locations:____
4 open adits at WR-1; 1 open shaft at WR-3

Hazardous structures: Yes X, No____, Number 2, types and locations:____
Partially collapsed cabin at middle site; loadout at WR-4

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Trench associated with collapsed adit at middle
site

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

- MBMG, Geology and Mineral Deposits of the Zosell (Emery) Mining District, Powell County, Montana, Memoir 34, Written by Forbes Robertson, 1953.
- MBMG, Well Log Database, July 14, 1994.
- MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.
- MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund in Montana 1983-1993, November 1993.
- MDEQ/AMRB Files, Hazardous Materials Inventory Site Investigation Log Sheet for Emery, Prepared by Pioneer Technical Services, Inc., July 16, 1993.
- USGS, Topographic Map, Baggs Creek, Montana, 7 1/2 minute Quadrangle, 1989.

LABORATORY ANALYTICAL DATA

**HIDDEN HAND
PA NO. 39-502**

INVESTIGATION DATE: 9/17/95

Metals in soils
Results per dry weight basis

Sb **As**

3

Category	Sub-category	Value
Total	Sub-category 1	100
	Sub-category 2	100
TOTAL	Sub-category 1	100
	Sub-category 2	100

1.42	44.4
1.43	44.7

Metals in Water
Results in ug/lAl

Wet Chemistry

Dissolved

Legend

SE-1- Tributary of Baggs Creek below edit discharge and WR4.

WR-1- Composite of WR1A, 1B, 2A, 28, (upper dumps).

WR-2- Composite of WR3A, 3B, 3C, 4A, 4B, (middle & lower dumps)

AD-1- Adit associated with WR-4.

1-800-855-8888

XRF ANALYSIS RESULTS

**HIDDEN HAND
PA NO. 39-502**

Mine Name: Hidden Hand PA No. 39-502
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrH	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
39-502-WR1A	155.94	25775	2030.5	2268.9				45960	720.53 *			108.69 *	9210.9
39-502-WR1B	251.83	20255	2429.1	1650.4			838.3 *	89940	1472.3 *			262.03	3088.8
39-502-WR2A	140.97	26054	2078.1	2236.1				44862	732.69 *			87.394 *	9296.4
39-502-WR2B	301.34	16901	20987	2224.2			613.8 *	67430	1153.8 *			442.1	2116.7
39-502-WR3A	454.3	14984	8047	1328.5			1340.1 *	48920	888.23 *			561.06	534.04
39-502-WR3B	71.333	20089	23224	1742.2			1313 *	70561	1590.7 *			310.13	4602.6
39-502-WR3C	45.527	18502	45601	1512.9				52638	585.4 *			306.96	4366.3
39-502-WR4A	121.53	16581	8159.8	2927.7			1237.9 *	47497	861.63 *			337.72	490.7
39-502-WR4B	284.8	21567	4873.4	2184.3				70407	1214 *			1674.9	
39-502-WR4B-DUPL	188.61	24293	5955.5	2440.2				74810	1231.7 *			1651.4	
39-502-WR1-COMP	219.28	20786	12119	2279.9			552.25 *	70664	1007.9 *			328.48	4729.1
39-502-WR2-COMP	253.25	20087	19591	2286.5			1171.4 *	57008	1002.5 *			471.28	2033
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
39-502-WR1A	155.94	158.9	16.49 *		1194.9		153.06				154.98		
39-502-WR1B	251.83	147.31	8.6659 *		218.25		136.44				376.27		
39-502-WR2A	140.97	151.51	18.65 *		1247.9		148.32				146.87		
39-502-WR2B	301.34	155.39			4811.3		103.91				397.37		
39-502-WR3A	454.3	153.29	13.539 *		194.87		91.065				906.01		
39-502-WR3B	71.333	107.89			1366.8		117.58				84.949		
39-502-WR3C	45.527	121.53	12.881 *		5295.8		130.81		109.43 *		124.63		
39-502-WR4A	284.8	157.27	19.789 *		888.58		94.01		135.4 *		483.75		
39-502-WR4B	188.61	137.46	15.266 *		12796		96.65 *		63.402 *		238.02		
39-502-WR4B-DUPL	219.28	132.57	14.55 *		13073		118.77		254.95 *		238.02		
39-502-WR1-COMP	253.25	146.2	8.1309 *		3372.9		118.35		235.16 *		245.92		
39-502-WR2-COMP	219.93	154.61	13.614 *		2845.5		117.19		132.38 *		284.78		
									71.9 *		390.01		

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**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**HIDDEN HAND
PA NO. 39-502**

AIMSS SCORESHEET

SITE NAME:

HIDDEN HAND

PA NUMBER:

39-502

LINE NO.

GROUNDWATER PATHWAY			
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 39.339
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	10
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 10.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 157356

SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	100
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 500
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 42.093
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18	SW - TARGETS	WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22 23
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 484070

AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	15
26B		DISTANCE TO POPULATION	10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 150
27		LIKELIHOOD SCORE	LINES 25 + 26C 150
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.382
29		POPULATION - 4 MILES	10
30	AIR - TARGETS	NEAREST RESIDENCE	5
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33 30
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 6219

DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 200
38		LIKELIHOOD SCORE	LINES 36 + 37C 250
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.294
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	5
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42 16
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 5176

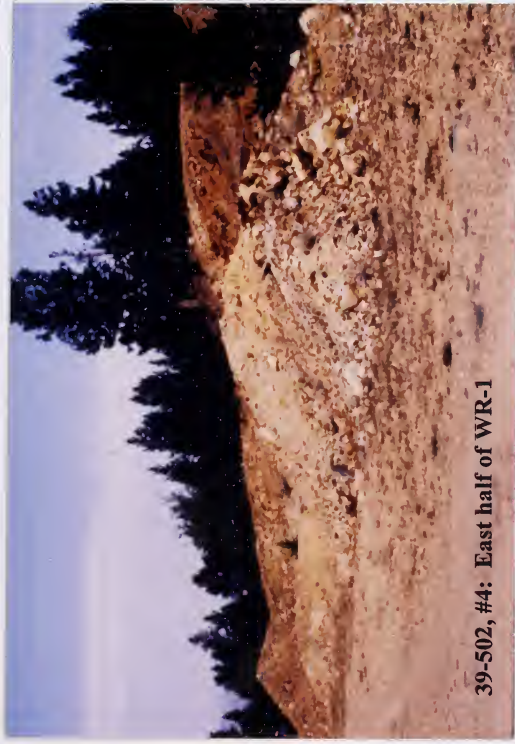
45 TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE
(LINES 10 + 24 + 35 + 44) / 100,000

6.53

LINE NO.			PA NUMBER:	39-502
	SITE SAFETY			
1	THREAT	ACCESSIBILITY		20
2	HAZARDS	OPEN SHAFTS	100 EA.	100
3		OPEN ADITS	50 EA.	200
4		UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	80
6		EXPLOSIVE HAZARD		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	
9	TARGETS	POPULATION - 1 MILE		1
10		NEAREST RESIDENCE		5
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	
13	SITE SAFETY SCORE		(LINES 1 x 8 x 12) / 1,000	145.60



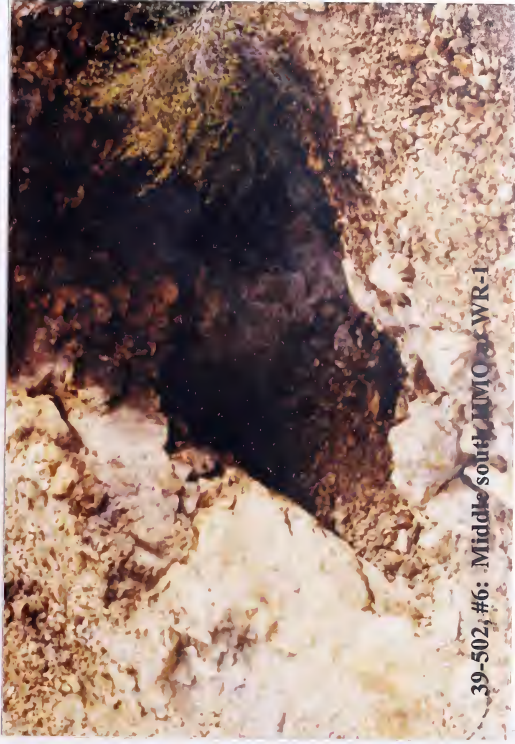
39-502, #3: West half of WR-1



39-502, #4: East half of WR-1



39-502, #5: South HMO at WR-1



39-502, #6: Middle south HMO at WR-1



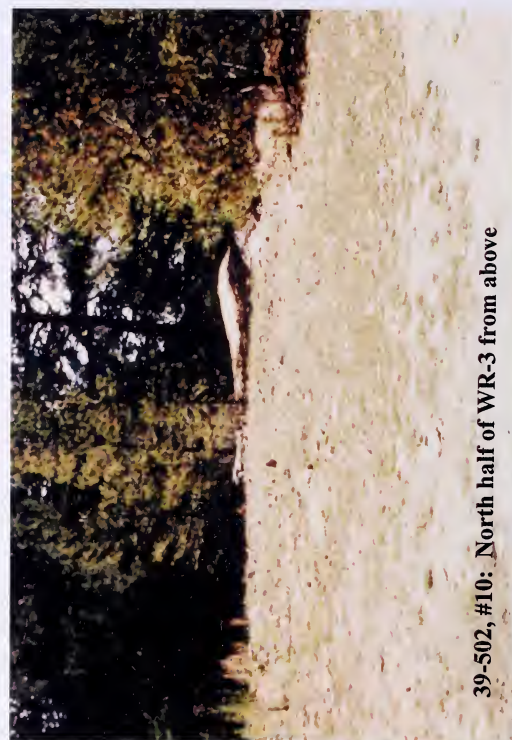
39-502, #8: Middle north HMO at WR-1



39-502, #8: North HMO at WR-1



39-502, #9: WR-2 from north



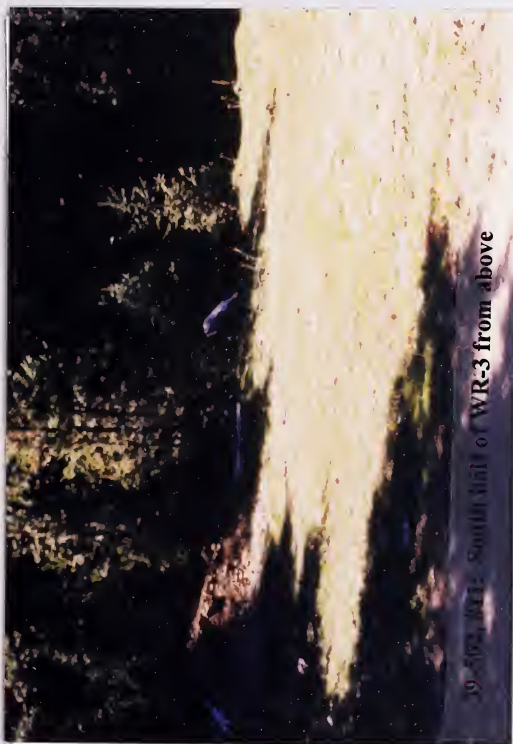
39-502, #10: North half of WR-3 from above



39-502, #12: South part of WR-3 from road (north)



39-502, #14: Spring and pond in drainage below WR-3



39-502, #11: South limit of WR-3 from above



39-502, #13: Open shaft near WR-3, looking



39-502, #15: East side of WR-4 (Note: Adit discharge)



39-502, #16: West side of WR-4 and loadout



39-502, #17: Adit discharge at WR-4; AD-1 sample location



MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: SPRING CREEK TAILINGS PA#: 39-503

Date: November 13, 1995 Time: 1000-1500

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, Liebelt, Pioneer

Visitors: None

Weather/Seasonality Observations: Cold; overcast; slight drizzle;
2" of frozen ground; ice on top of creek.

Photographic Log (Photo No.'s/Video Tape Number): No photos were taken.

Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms):
Large tailings area, but fairly well (50%) vegetated. High arsenic
and lead concentrations in active stream.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Tailings
containment or removal. Possibly pull tailings back from
streambed, cover, and revegetate. Reconstruct stream.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SPRING CREEK TAILINGS PA#: 39-503

Legal Description: T 7N ; R 8W ; Sec. 11 , NE 1/4 SW 1/4 1/4

County: POWELL Mining District: EMERY

Latitude: N 46° 22' 05" Longitude: W 112° 34' 29"

Primary Drainage Basin and Code: Clark Fork River/17010201

Secondary Drainage Basin: Cottonwood Creek/Spring Creek

USGS Quadrangle map name(s): Sugarloaf Mountain

Mine Type/Commodities: Millsite/Gold

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): USFS with
unpatented claims held by Montana Precision Mining.

Relationship to other mines/sites in the area/district: 1/4 mile
east of Emery complex; 1/2 mile south of Bonanza.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown

General site features: Elevation 6040' , Slope 10° ,
Aspect South

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 1.5 acre(s) .

Site Dimensions: 525 feet x 225 feet

Predominant vegetation types: Lodgepole pine, firs, alder

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd , trail X .

Other logistical considerations (proximity to other sites). Walk
in to the site 1/2 mile from road above or 3/4 mile from road
below.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 2
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). District is underlain by andesite, a
formation of probable late Cretaceous age that consists of flows,
tuffs, and breccias. In the Zosell district, this formation
consists chiefly of flows; it is a dark green/gray rock containing
white amygdules and generally characterized by small, white
phenocrysts of feldspar. Spring Creek flows northwest to
confluence with North Fork Cottonwood Creek 0.1 mile below site.
North Fork Cottonwood Creek flows southwest 1 mile to confluence
with Cottonwood Creek, which flows west and southwest to confluence
with the Clark Fork River approximately 13 miles downstream from
the site.

Mining/milling history, ore type/tenor, host rock, gangue: 600
ton/day mill was constructed in 1916 to test floatation treatment
of Emery ore. Ore was in andesite.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes___, No X, # ____, Comment_____
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes___, No X, # ____, Comment_____
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes X, No____. If yes answer the next three
questions:

Period(s) of Operation: 1916 to unknown

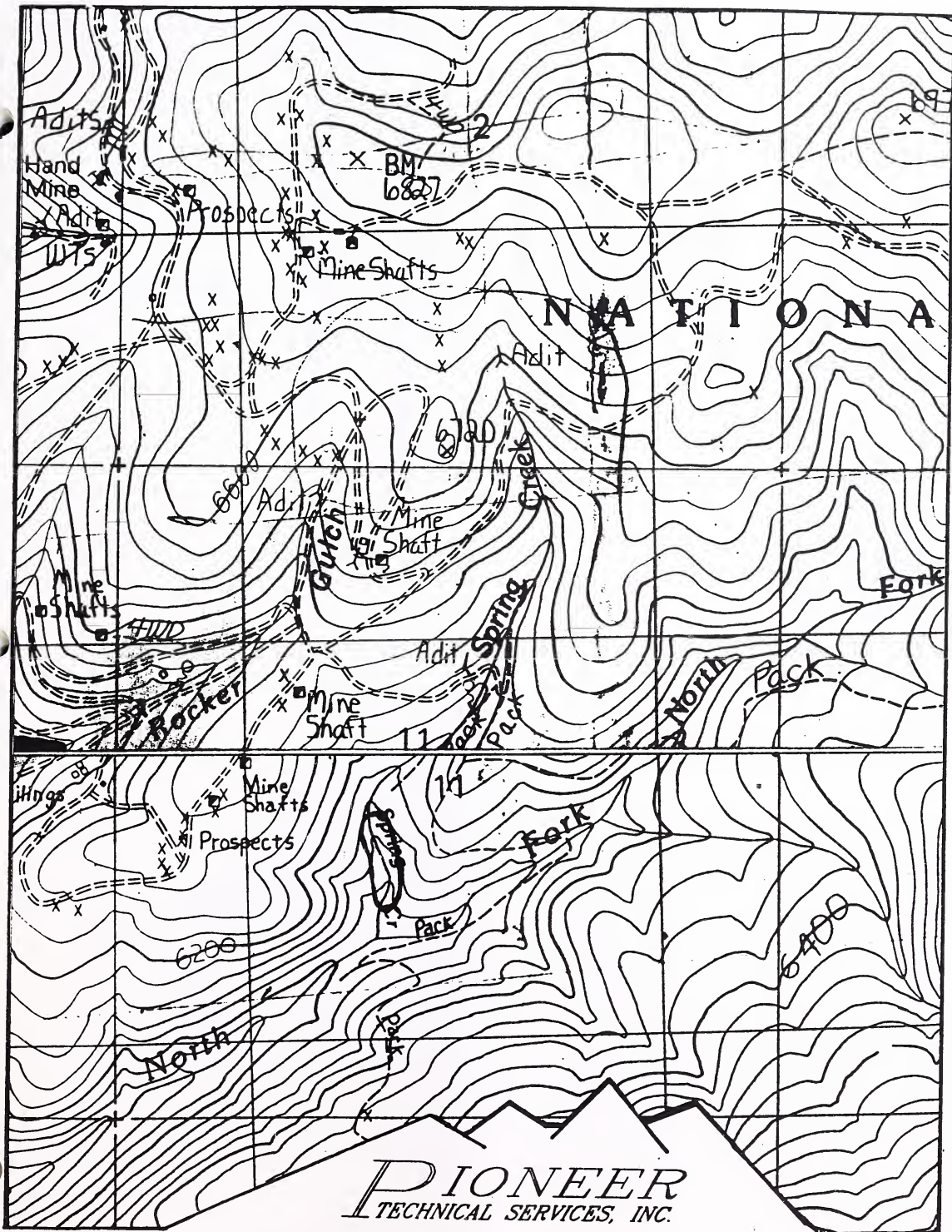
Origin of Ore Milled - Custom Mill___ Dedicated Mill X; Number and
names of mines that supplied mill feed: Emery Mine

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Concentration, then floatation

Montana Bureau of Mines and Geology
Water Well Log Data

11/03/1993

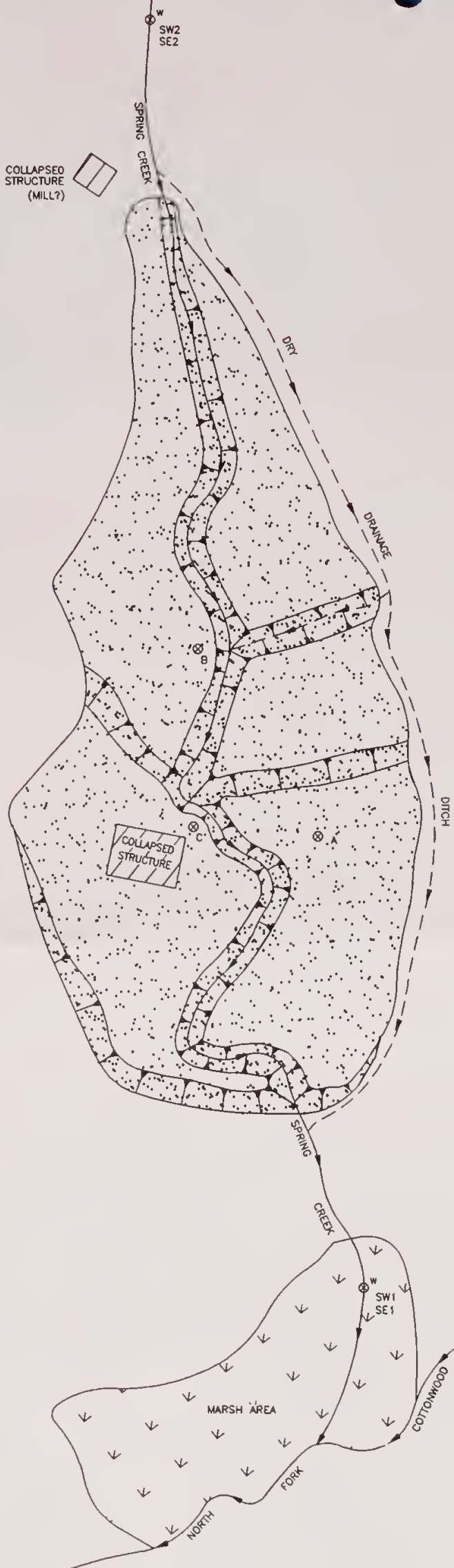
Well No.	Location	Depth	Yield	Static Water Level
M:55818	07N 08W 10 BBB	113.0	20.0	67.00
M:55819	07N 08W 10 BCBB	114.0	15.0	0.00



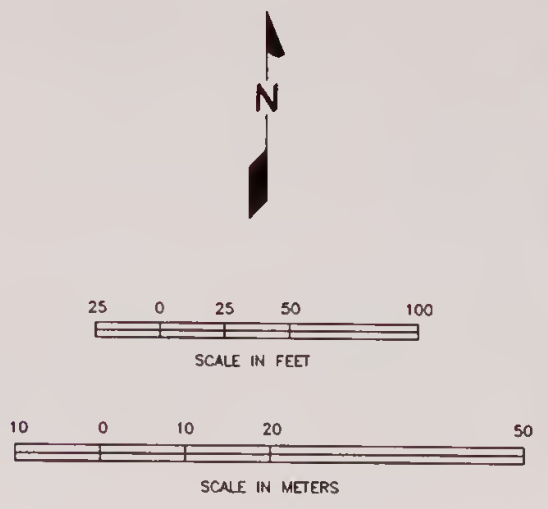
SPRING CREEK TAILINGS, P.A. NO. 39-503

T07N. R08W. SECTION 11









SCALE: 1" = 1000'




TP1
AREA = 7700 SQ.YDS.
VOLUME = 7700 CU.YDS.



LEGEND

-  XRF SAMPLE
-  WATER SAMPLE GROUND AND SURFACE
-  STRUCTURE
-  VEGETATED WETLANDS
-  DRAINAGE
-  DRY DRAINAGE
-  SLOPE DIRECTION
-  WASTE ROCK OUMP OR TAILINGS PILE

GPS FILE CREATED 11/13/95

<div>DRAWN FOR:</div> <div>PIONEER</div> <div>TECHNICAL SERVICES, INC.</div> <div>P.O. BOX 3445</div> <div>BUTTE, MT 69702</div>	<div>TITLE:</div> <div>SPRINGCREEK TAILINGS</div> <div>PA# 39-503</div>
	<div>DRAWING NO.:</div> <div>PT342110</div>
	<div>DATE:</div> <div>1/30/96</div> <div>PLOT SCALE: 1" = 20'</div>

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): 50% sand, 50% silt/clay

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Maximum depth 8 to 9 feet; average depth approximately 3 feet. No consistent stratification.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Breached dam with active stream meandering through; much of tailings have eroded away.

Comments on potential for mitigation: High metals, but appear to support vegetation. Remove tailings from stream floodplain; move laterally (wide valley) or off-site.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Liebelt

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	PH SU (D/S)*	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-1	TAIL	7,700	Southeast part of pond; 0-4'	None	3.8	0.03	39-503-TP-1	11/13/95 1400	T-Metals, ABA, Cyanide
TP-1A-2	TAIL		Southeast part of pond; 4-7'	None	3.9	0.04			
TP-1B-1	TAIL		Northwest part of pond; 0- 3.5'	None	5.2	0.03			
TP-1B-2	TAIL		Northwest part of pond; 3.5- 7'	None	5.0	0.03	39-503-TP-2	11/13/95 1430	T-Metals, ABA, Cyanide
TP-1B-3	TAIL		Northwest part of pond; 7-9'	None	4.6	0.03			
TP-1C	TAIL		West pile, near wood structure	None	5.2	0.03	N/A	N/A	XRF Analysis

* pH readings were taken directly on-site (Galvey Meter).

Comments or deviations from SOPs: 39-503-TP-1 is a composite of TP-1A-1 and -1B-1. 39-503-TP-2 is a composite of TP-1A-2, -1B-2, and -1B-3. Background sample was collected from the Emery site (39-004-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes___, No X, Number:___ Identification:_____

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 24

Distance to nearest well used for drinking:

___<1,000 ft; ___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable X, Possible___, Unlikely___.

Shallow groundwater (floodplain) and high metals concentrations

Approximate Depth to Groundwater: X<25 ft; ___ 25 - 100 ft; ___ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Spring Creek bisects tailings and is tributary to North Fork Cottonwood Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): TP-1 is in Spring Creek.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 15 gpm
High Flow: 50 gpm, Average Flow: 20 gpm

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No ,
Describe: Spring Creek flows through and is actively eroding tailings.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, wetlands, fishery, agriculture

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 .
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings in streambed 300 feet to confluence with North Fork Cottonwood Creek.

SAMPLERS: Tuesday, Clark

[illegible]

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 5 acres including tailings; a wide valley at tailings and below

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: ___<1,000 ft; ___1,000 ft - 0.5 miles; X>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

SAMPLERS: Tuesday, Liebelt

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences, gates, or warning signs;____ Moderately Accessible - barbed wire fences, road gated, or signs posted;____ Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes X, No____, Comment Bald Eagle
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____, types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____, Number 1, types and locations: Tailings are undercut by stream at several locations along Spring Creek.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Prepared by Montana Natural Resource Information System, July 1995.

MDEQ/AMRB Files, Hazardous Materials Inventory Site Investigation Log Sheet for Emery, Prepared by Pioneer Technical Services, Inc., July 16, 1993.

MDEQ/AMRB Files, Protected report from Anaconda Geological Document Collection, Emery Mine, Written by Claud C. Whitmore, December 5, 1918.

USGS, Geology and Ore Deposits of the Butte District, Montana, Professional Paper 74, Written by W.H. Weed, 1912.

USGS, Topographic Map, Sugarloaf Mountain, Montana, 7 1/2 minute Quadrangle, 1989.

LABORATORY ANALYTICAL DATA

SPRING CREEK TAILINGS

PA NO. 39-503

Spring Creek Tailings PA# 39-503
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 9/14/95

SOLID MATRIX ANALYSES																			
Metals in soils Results per dry weight basis																			
FIELD ID	Sb (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Ca (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)	CYANIDE (mg/kg)		
39-503-SE-1	134	3110 J	93.3	30.9 J	12700	46.2 J	16.3	133	44700 J	1650 J	11200	8250 J	0.14	168	218 J	3750 J	NR		
39-503-SE-2	8.7 U	114 J	74.6	21.1 J	6090	35.3 J	22.6	39.8	40500 J	82.4 J	15200	760 J	0.046 U	48.6	1.2 U	437 J	NR		
39-503-TP1	337	6950 J	63.9	55.2 J	31800	37.0 J	14.3	244	54500 J	4900 J	17900	5750 J	0.40	13.5	60.7 J	6490 J	<0		
39-503-TP2	602	13400 J	39.5	99.2 J	26300	16.1 J	11.6	359	57800 J	5320 J	12100	17400 J	0.31	3.2 U	96.3 J	9230 J	1		
BACKGROUND	7 UJ	91	295	3.5	NR	36.9	13.9	67.3	43400	43	NR	2990	0.165	7	NR	171	NR		
Acid/Base Accounting																			
FIELD ID	Total Sulfur		Neutral Potent. equiv	Tot. Sulfur		Pyritic Sulfide	Acid Base Potential equiv		Pyritic Sulfide	Acid Base Potential equiv		Lime Req. Subst. res. ltr.	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv	Lime Req. Dolphop. equiv
	SULFUR %	Acid Base		Potential	equiv		Acid Base	Potential		equiv	Acid Base								
39-503-TP1	2.34	73.1	95.3	22.2	<0.01	1.98	0.46	61.9	33.4	33.40	70.14	76.25	23.81	50.01	50.01	50.01	50.01	50.01	50.01
39-503-TP2	3.72	116	105	-11.5	<0.01	2.89	1.38	93.4	11.3	11.30	23.73	136.56	-39.45	-82.85	-82.85	-82.85	-82.85	-82.85	-82.85

WATER MATRIX ANALYSES																	
Metals in Water Results in ug/l																	
FIELD ID	Sb (ug/L)	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Ca (ug/L)	Cr (ug/L)	Co (ug/L)	Cu (ug/L)	Fe (ug/L)	Pb (ug/L)	Mg (ug/L)	Mn (ug/L)	Hg (ug/L)	Ni (ug/L)	Ag (ug/L)	Zn (ug/L)	HARDNESS (mg CaCO ₃ /l)
39-503-SW-1	10.4 J	50.4	13.4	0.77 J	50300	9.8	8.3 U	2.8 J	190	35.5 J	12500	46.5 J	0.14 U	16.9 U	0.21 U	78.0	177000
39-503-SW-2	3.5 J	7.2	12.3	0.22 J	48900	8.7 U	8.3 U	2.0 U	25.3	0.93 U	12300	5.8 J	0.14 U	16.9 U	0.21 U	34.4	173000
Wet Chemistry Results in mg/l																	
FIELD ID	Total Dissolved Solids		CHLORIDE		SULFATE		NO ₃ /NO ₂ -N		CYANIDE								
	250	< 5	95	NR	NR	NR	NR	NR	NR	NR							
39-503-SW-2	242	< 5	87	NR	NR	NR	NR	NR	NR	NR							

Legend

SE-1: In Spring Creek, 100' downstream from main tailings impoundment.
SE-2: In Spring Creek, 100' upstream from site.
TP1: Composite of subsamples TP1A-1 and TP1B-1.
TP2: Composite of subsamples TP1A-2, TP1B-2, and TP1B-3.
BACKGROUND: From the Emery Mine (30-004-SS-1) (1993 data).
SW-1: Same as SE-1.
SW-2: Same as SE-2.

U: Not Detected; J: Estimated Quantity; X: Outlier for Accuracy or Precision; NR: Not Requested

Legend
SE-1- In Spring Creek, 100' downstream from main tailings impoundment.
SE-2- In Spring Creek, 100' upstream from site.
TP1- Composite of subsamples TP1A-1 and TP1B-1.
TP2- Composite of subsamples TP1A-2, TP1B-2, and TP1B-3.
BACKGROUND- From the Emery Mine (39-004-SW-1) (1993 data).
SW-1- Same as SE-1.
SW-2- Same as SE-2.

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

XRF ANALYSIS RESULTS

**SPRING CREEK TAILINGS
PA NO. 39-503**

Mine Name: Spring Creek Tailings PA No. 39-503
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
39-503-TP1A-1	521.068 *	25983.3	26020.8	2656.69		5746.22	43056.5	535.685 *		391.072	6488.55	7717.54	
39-503-TP1A-2	607.359 *	25868.1	25441.6	2143.91	231.42 *	8340.24	42399.7			376.647	6837.4	6582.33	
39-503-TP1B-1		22424.6	28481.2	2353.28		5811.66	39333.1			130.683 *	3751.94	4771.38	
39-503-TP1B-2	521.291 *	20759.2	22752.3	2102.46		15705.3	34676			180.915 *	3357.72	8183.9	
39-503-TP1B-3	451.346 *	16920.2	20792.2	1568.41		24869.1	34686.4			208.857 *	6059.97	10994.6	
39-503-TP1B-3-DUP		17803.2	21128.8	1599.41		24939.3	34361.7			239.033 *	6075.75	10849.7	
39-503-TP1C	509.861 *	51485.5	8582.2	2910.21		2737.42	42976.4			385.412	4656.85	12595.9	
39-503-TP1-COMP	441.35 *	22833.8	27268	2321.08		5788.67	39911.3			97.8366 *	3887.35	4418.02	
39-503-TP2-COMP		27095.2	30913.7	2718.72		14913.3	42959.9			357.094	6256.95	9611.75	

XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
39-503-TP1A-1	203.652	120.647			7368.98	93.3794 *			2235.51	464.731			
39-503-TP1A-2	178.084	111.289			6964.13	102.055			1555.17	437.567			
39-503-TP1B-1	223.292	129.287			1618.27	83.4325			513.688	436.036			
39-503-TP1B-2	114.084	114.595			2238.04	59.8216 *			762.628	254.852			
39-503-TP1B-3	104.725	97.963			2979.7	62.4131 *			1019.63	229.031			
39-503-TP1B-3-DUP	95.782	101.441			3044.96	71.7571 *			970.077	223.571			
39-503-TP1C	108.164	147.464			7336.52	159.939			1600.76	303.721			
39-503-TP1-COMP	213.827	119.151		70.4507 *	1839.95	81.5266			676.884	401.721			
39-503-TP2-COMP	175.872	131.882			4331.2	84.7166 *			1315.3	410.31			

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET

SPRING CREEK TAILINGS
PA NO. 39-503

AIMSS SCORESHEET

SITE NAME: SPRING CREEK TAILINGS
PA NUMBER: 39-503

LINE NO.			
GROUNDWATER PATHWAY			
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	5.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	22
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	100
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18	SW - TARGETS	WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	10
30	AIR - TARGETS	NEAREST RESIDENCE	0
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT	POPULATION - 1 MILE	1
41	TARGETS	NEAREST RESIDENCE	0
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		(LINES 10 + 24 + 35 + 44) / 100,000

SITE NAME: SPRING CREEK TAILINGS
PA NUMBER: 39-503

LINE NO.	SITE SAFETY		
1	THREAT	ACCESSIBILITY	20
2	HAZARDS	OPEN SHAFTS	0
3		OPEN ADITS	0
4		UNSTAB. HIWALLS / PITS	0
5		HAZ. STRUCTURES	0
6		EXPLOSIVE HAZARD	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE	0
9		SUM LINES 2 THRU 7	1
10	TARGETS	POPULATION - 1 MILE	0
11		NEAREST RESIDENCE	0
12		RECREATIONAL USE	1
13		TARGETS SCORE	0.00
		SUM LINES 9 THRU 11	
		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: S & H PA#: 45-017

Date: October 7, 1995 Time: 1445-1545

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, Pioneer

Visitors: None

Weather/Seasonality Observations: Warm (55°F); calm; cloudy; wet
spring and summer.

Photographic Log (Photo No.'s/Video Tape Number): #15: Open adit (AD-1 sample
location); #16: WR-1 from west and above; #17: WR-1 from east on
trail. No video was taken.

General Comments/Observations (not covered specifically in attached Inventory Forms): Last
claimed by S & H Mining in 1988. Site lies on well maintained
and travelled USFS trail.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: May require
treatment of discharge. Grade and revegetate dump.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): S & H PA#: 45-017

Legal Description: T 18N ; R 26W ; Sec. 8 , SE 1/4 SW 1/4 1/4

County: Sanders Mining District: Plains

Latitude: N 47° 19' 35" Longitude: W 114° 56' 20"

Primary Drainage Basin and Code: Clark Fork River/17010204

Secondary Drainage Basin: Clark Fork River

USGS Quadrangle map name(s): Keystone Peak

Mine Type/Commodities: Hardrock/Copper, Silver

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership status: Known Y X N ; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): USFS

Relationship to other mines/sites in the area/district: Keystone District is located one mile south of site.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Unknown; PVC pipe has been installed to direct adit discharge below trail (culvert).

General site features: Elevation 2600' , Slope 40° , Aspect North

Land use: Mining , Recreational X , Residential , Urban , Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 0.1 acre(s).

Site Dimensions: 20 feet x 40 feet

Predominant vegetation types: Spruce, pine, larch

Access: roads - good (paved) , poor (maintained dirt road) , 4wd , trail X .

Other logistical considerations (proximity to other sites). Hike in from Donlan; no nearby sites.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 8
well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Precambrian belt series rock. 100 feet
from the Clark Fork River.

Mining/milling history, ore type/tenor, host rock, gangue: No
information was found.

Mine Operation?

Shafts - Yes___, No X, # ___ , Comment_____
Adits - Yes X, No___, # 1, Comment Discharging, partly open
Pits - Yes___, No X, # ___ , Comment_____
Placers - Yes___, No X, # ___ , Comment_____
Other - Yes___, No X, # ___ , Comment_____

Mill Operation? Yes___, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: N/A

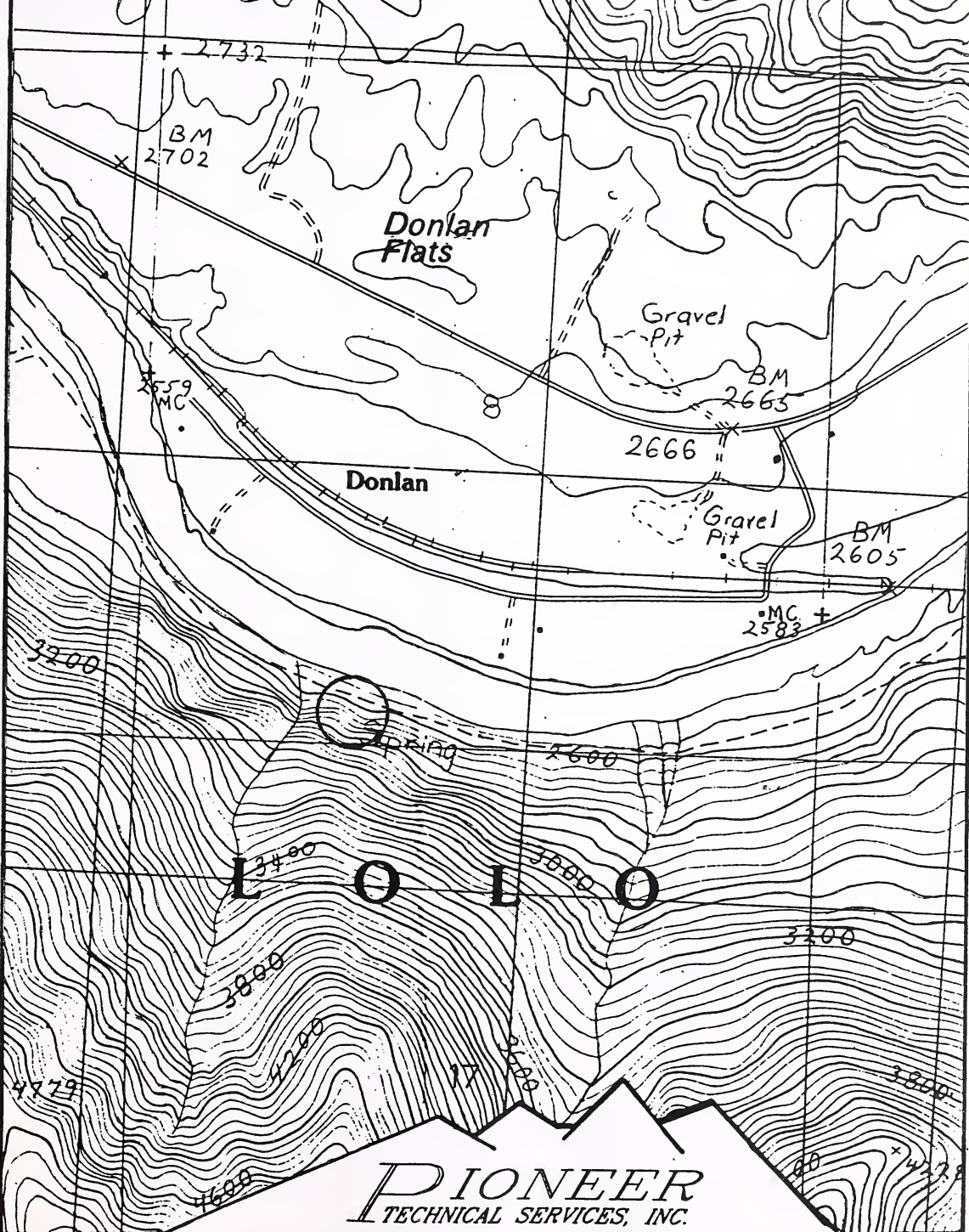
Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

Montana Bureau of Mines and Geology
Water Well Log Data

09/14/1995

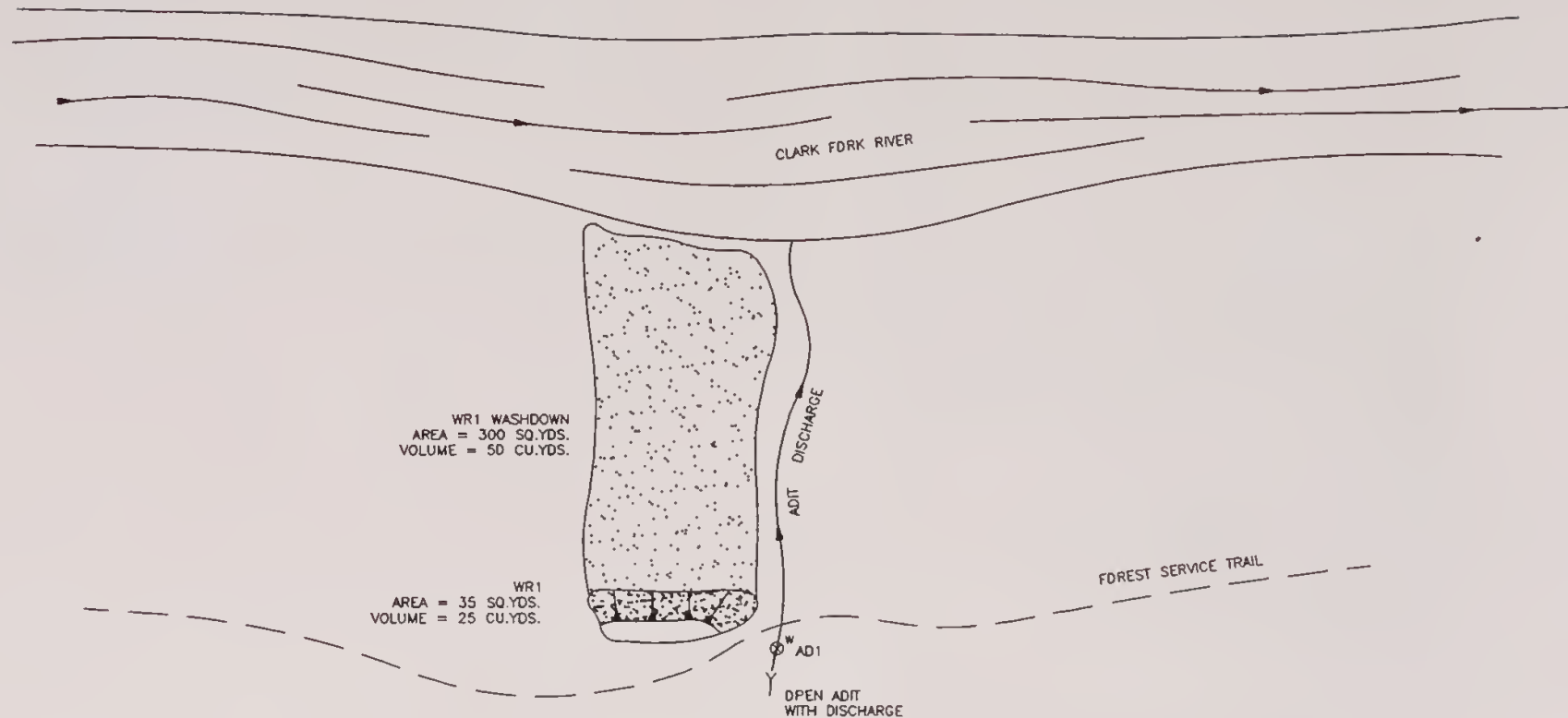
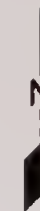
Location	Depth	Yield	Static Water Level
----------	-------	-------	--------------------

18N 26W 08	81.0	35.0	55.00
18N 26W 08	100.0	35.0	68.00
18N 26W 08	92.0	50.0	58.00
18N 26W 08	94.0	0.0	0.00
18N 26W 08 DA	126.0	20.0	104.00
18N 26W 08 DC	85.0	30.0	56.00
18N 26W 08 DDA	100.0	30.0	80.00
18N 26W 08 DDC	99.3	35.0	52.00





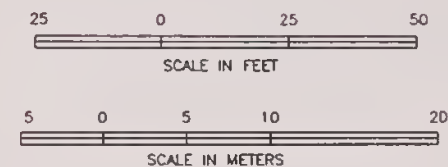
PIONEER
TECHNICAL SERVICES, INC.

S & H, P.A. NO. 45-017
T12N. R26W. SECTION 8
SCALE: 1" = 1000'



LEGEND

- ⊗ XRF SAMPLE
- ⊗^W WATER SAMPLE
GROUND AND SURFACE
- OPEN ADIT
- < COLLAPSED ADIT
- > DRAINAGE
- > DRY DRAINAGE
- TRAIL
-  SLOPE DIRECTION
-  WASTE ROCK DUMP
OR TAILINGS PILE



GPS FILE CREATED 10/7/95

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.
P.O. BOX 3445
BUTTE, MT 59702

TITLE

S & H
PA# 45-017

DRAWING NO.: PT342116

DATE: 1/25/96

PLOT SCALE: 1 = 10

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TP); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A



SAMPLERS: Tuesday

[illegible]

pH readings were taken directly on-site (Kjelvey Meter).

Comments or deviations from SOPs: 45-017-WR-1 is a composite of WR-1A and -1B. Background sample was collected at the Nancy Lee Mine (31-001-SS-1) during the 1993 investigation.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 19

Distance to nearest well used for drinking:

X (across Clark Fork River) <1,000 ft; 1,000 ft to 0.5 miles;
 >0.5 miles.

Sample types: Flowing adits (AD); *filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Low metals concentration; high pH; shallow groundwater.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Tuesday

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/run-off) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Clark Fork River

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Adit discharge

Waste materials within any floodplain: Yes , No X Source ID(s):

Approximate Flood frequency? 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: , Average Flow:

Distance between waste source(s) and nearest surface water body (ft)? WR-1 is 100 feet from the Clark Fork River.

Surface water draining onto or through waste sources: Yes , No X, Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Fishery, wetlands, T&E habitat, irrigation, agriculture, and recreation

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? None due to steep slope.

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes X, No___, Describe: Belt series carbonate rocks

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: X <1,000 ft; ___ 1,000 ft - 0.5 miles; ___ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Tuesday

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10____; 10-30 X; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Site is
along well maintained/used trail.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle, Peregrine

Bat Habitat - Yes X, No____, Comment Possible (adit)

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 2

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Adit partially collapsed, but accessible.

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Highwall above adit opening

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Analytical Results, Water Quality Analyses, May 3, 1988.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDHES/SHWB, Superfund Basics, Overview and Accomplishments of Superfund
in Montana 1983-1993, November 1993.

MDEQ/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for S
and H Mine, Prepared by Northern Engineering and Testing, August 6,
1988.

USGS, Topographic Map, Keystone Peak, Montana, 7 1/2 minute Quadrangle,
1985.

LABORATORY ANALYTICAL DATA

S & H

PA NO. 45-017

S & H PA# 45-017
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER-TUESDAY
INVESTIGATION DATE: 10/7/95

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Sb (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Ca (mg/kg)	Cr (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)	CYANIDE (mg/kg)
45-017-WR-1	4.1 U/J	14.1 J	51.7	0.43 U	208	2.4 J	1.4 U	822 J	15400	99.4 J	1820	30.4	0.23 J	5.8 J	1.6	16.2	NR
BACKGROUND	5.39 U	7.89	6.8	0.5 U	NR	1.2 U	3.31	2.44 J	3120	7.59 J	NR	609	0.00965 UJ	2.22 U	NR	11.9	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	Total Sulfur Acid Base Potential	Neutral Potent	Tot. Sulfur Acid Base Potential	Sulfate %	Pyritic Sulfur %	Organic Sulfur %	Pyritic Sulfur Acid Base Potential	Pyritic Sulfur Acid Base Potential	Sobek (10000)	Lime Req. (lbs.) 1 lb	Potential Acidity	Lime Req. Dolphoff (10000)	Lime Req. Dolphoff (lbs.) 1 lb
45-017-WR-1	0.44	13.7	0.92	-12.8	0.05	0.01	0.38	0.31	0.61	0.61	1.28	13.38	-15.55	-32.85

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

WATER MATRIX ANALYSES

Metals in Water
Results in µg/l

FIELD ID	Sb (µg/L)	As (µg/L)	Ba (µg/L)	Cd (µg/L)	Ca (µg/L)	Cr (µg/L)	Co (µg/L)	Cu (µg/L)	Fe (µg/L)	Pb (µg/L)	Mg (µg/L)	Mn (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	HARDNESS (mg CaCO ₃ /L)
45-017-AD-1	3.2	1.5 U	111	0.046 U	23000	8.7 U	8.3 U	7.2 J	19.1 J	0.93 U	6220	4.5 J	0.23 JX	16.9 U	0.99 JX	21.5	83.1

Wet Chemistry
Results in mg/l

FIELD ID	Total Dissolved Solids	CHLORIDE	SULFATE	NO ₃ /NO ₂ -N	CYANIDE
45-017-AD-1	114	< 5	18.0	NR	NR

U- Not Detected, J- Estimated Quantity, X- Outlier for Accuracy or Precision, NR- Not Requested

Legend

WR-1- Composite of WR1A, 1B.
BACKGROUND- Taken from Nancy Lee Mine (31-001-SS1) (1993 data)
AD-1- Adit discharge near WR-1.

XRF ANALYSIS RESULTS

S & H

PA NO. 45-017

Mine Name: S&H PA No. 45-017
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHf	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Se
45-017-WR1A		29414	1126.2 *	3451.4	289.42 *		28048	483.02 *		720.41			
45-017-WR1B		23801	1424.4	2472.3			24828	398.24 *		909.43	65.761 *		
45-017-WR1-COMP		29281	1255.4 *	3080.1			29269			849.96			
XRF SAMPLE I.D.	Sr	Zr	Mo	Hg	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
45-017-WR1A	51.764	429.22	41.451		108.2	139.8				622.56	147.15 *		21.769 *
45-017-WR1B	49.829	275.71	66.619		160.78	104.81				412.21		21.313 *	17.286 *
45-017-WR1-COMP	57.289	439.44	44.136		116.52	106.66				587.7		17.605 *	16.147 *

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET

S & H
PA NO. 45-017

AIMSS SCORESHEET

SITE NAME:

S & H

PA NUMBER:

45-017

LINE NO.			
GROUNDWATER PATHWAY			
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A		CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6			1,262
7	GW - TARGETS	WELLS - 1 MI. x 2.5	20.0
8		WELLS - 1 TO 4 MI	11
9		NEAREST WELL	10
10		TARGETS SCORE	LINES 6 + 7 + 8
			41.0
		GROUNDWATER SCORE	LINES 4 x 5 x 9
			20697
SURFACE WATER PATHWAY			
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16			1,354
17	SW - TARGETS	DRINKING WATER POP'N	0
18		IMPACTED DRAINAGE	0
19		WETLANDS	10
20		FISHERY	10
21		RECREATION	5
22		IRRIGATION/STOCK	2
23		T & E SPECIES HABITAT	5
24		TARGETS SCORE	SUM LINES 16 THRU 22
			32
		SURFACE WATER SCORE	LINES 14 x 15 x 23
			8666
AIR PATHWAY			
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE	0
26A		CONTAINMENT	10
26B		DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29			0.000
30	AIR - TARGETS	POPULATION - 4 MILES	10
31		NEAREST RESIDENCE	10
32		WETLANDS	10
33		PARKS / WILDERNESS	0
34		T & E SPECIES HABITAT	5
35		TARGETS SCORE	SUM LINES 29 THRU 33
			35
		AIR PATHWAY SCORE	LINES 27 x 28 x 34
			1
DIRECT CONTACT PATHWAY			
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE	50
37A		ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40			0.000
41	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	10
42		NEAREST RESIDENCE	10
43		RECREATIONAL USE	10
44		TARGETS SCORE	SUM LINES 40 THRU 42
			30
		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
			1
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		
	(LINES 10 + 24 + 35 + 44) / 100,000		
			0.29

LINE
NO.

SITE NAME:

S & H

PA NUMBER:

45-017

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVE HAZARD		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	125
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	30
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	75.00

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

S & H
PA NO. 45-017

MONTANA BUREAU OF MINES AND GEOLOGY
 BUTTE, MONTANA 59701 (406) 496-4101

WATER QUALITY ANALYSIS
 LAB NO. 88Q0304

STATE MONTANA	COUNTY MINERAL
LATITUDE-LONGITUDE 2° N 10° W	SITE LOCATION 18N 26W 17
UTM COORDINATES 2 N E	MRMC SITE
TOPOGRAPHIC MAP PLAINS 15'	STATION ID
GEOLOGIC SOURCE *	SAMPLE SOURCE MINE DRAINAGE
DRAINAGE BASIN PD	LAND SURFACE ALTITUDE
AGENCY + SAMPLER USFS/AER	SUSTAINED YIELD
BOTTLE NUMBER D7-8801	YIELD MEAS METHOD
DATE SAMPLED 03-MAY-88	TOTAL DEPTH OF WELL
TIME SAMPLED 14:00 HOURS	SWL ABOVE(-) OR BELOW GS
LAB + ANALYST MRMC/WO	CASING DIAMETER
DATE ANALYZED 01-JUN-88	CASING TYPE
SAMPLE HANDLING	COMPLETION TYPE *
METHOD SAMPLED	PERFORATED INTERVAL
WATER USE RECREATIONAL	

SAMPLING SITE
 GEOLOGIC SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	21.8	1.09	BICARBONATE (HCO3)	113.9	1.87
MAGNESIUM (MG)	6.8	.56	CARBONATE (CO3)	0.	
SODIUM (NA)	8.7	.38	CHLORIDE (CL)	.7	.02
POTASSIUM (K)	1.5	.04	SULFATE (SO4)	11.7	.24
IRON (FE)	.10	.01	NITRATE (AS N)	.10	.01
MANGANESE (MN)	.039	.00	FLUORIDE (F)	.1	.01
SILICA (SiO2)	11.0		PHOSPHATE TOT (AS P)		

TOTAL CATIONS 2.10 TOTAL ANIONS 2.14

STANDARD DEVIATION OF ANION-CATION BALANCE (SIGMA) .250

CALCULATED DISSOLVED SOLIDS	118.64	TOTAL HARDNESS AS CaCO3	82.42
SUM OF DISS. CONSTITUENT	176.43	FIELD HARDNESS AS CaCO3	
FIELD CONDUCTIVITY, MICROMHOS		TOTAL ALKALINITY AS CaCO3	93.41
LAB CONDUCTIVITY, MICROMHOS	215.3	FIELD ALKALINITY AS CaCO3	
FIELD PH		RYZNAR STABILITY INDEX	9.38
LABORATORY PH	6.90	LANGLIER SATURATION INDEX	-1.24
ADJUSTED SODIUM AD. RATIO		SODIUM ADSORPTION RATIO	.41

PARAMETER	VALUE	PARAMETER	VALUE
ALUMINUM, DISS (UG/L-AL)	240.	NICKEL, DISS (UG/L AS NI)	<10.
SILVER, DISS (UG/L AS AG)	<2.	PHOSPHATE, TOT, DIS (MG/L-P)	<.1
BORON, DISS (UG/L AS B)	<20.	STRONTIUM, DISS (UG/L-SR)	410.
CADMIUM, DISS (UG/L AS CD)	<2.	TITANIUM, DISS (UG/L AS TI)	2.
CHROMIUM, DISS (UG/L-CR)	<2.	VANADIUM, DISS (UG/L AS V)	2.
COPPER, DISS (UG/L AS CU)	<2.	ZINC, DISS (UG/L AS ZN)	26.
LITHIUM, DISS (UG/L AS LI)	9.	ZIRCONIUM, DISS (UG/L - ZR)	4.
MOLYBDENUM, DISS (UG/L-MO)	<20.	O-PHOSPHATE, DISS (MG/L-P)	.1
BROMIDE, DISS (MG/L AS BR)	<.1	ARSENIC, DISS (UG/L AS AS)	.2
LEAD, DISS (UG/L AS PB)	<40.	MERCURY, DISS (UG/L AS HG)	<.04
ARSENIC, BIO. (UG/L AS AS)	.4	MERCURY, BIO. (UG/L AS HG)	<.04
LEAD, BIO. (UG/L AS PB)	<40.		

REMARKS: REOPENED MINE PORTAL

EXPLANATION: MG/L = MILLIGRAMS PER LITER, UG/L = MICROGRAMS PER LITER, MEQ/L = MILLIEQUIVALENTS PER LITER, FT = FEET, MT = METERS. (M) = MEASURED, (E) = ESTIMATED, (R) = REPORTED, TR = TOTAL RECOVERABLE, TOT = TOTAL, BIO = BIOLOGICALLY AVAILABLE, SIGMA INCLUDES AL, CU, SR, ZN, AND H+ IF REPORTED.

OTHER AVAILABLE DATA QW WA S2 WJ QW PW AT OTHER
 OTHER FILE NUMBERS:

LAST EDIT DATE: 15-JUN-88 BY: TP *RCS
 PROCESSING PROGRAM: F1730P V4 (12/19/86) PRINTED: 16-JUN-88

PERCENT MEQ/L (FOR PIPER PLOT)
 CA MG NA K CL SO4 HCO3 CO3
 52.0 26.7 18.1 1.8 .9 11.4 87.7 .0

NOTE: IN CORRESPONDENCE, PLEASE REFER TO LAB NUMBER: 88Q0304

MONTANA BUREAU OF MINES AND GEOLOGY
 BUTTE, MONTANA 59701 (406) 494-4101

WATER QUALITY ANALYSIS
 LAB NO. 88Q0305

STATE MONTANA COUNTY MINERAL
 LATITUDE-LONGITUDE D N W SITE LOCATION 18N 26W 17
 UTM COORDINATES Z N E MBMG SITE
 TOPOGRAPHIC MAP PLAINS 15' STATION ID
 GEOLOGIC SOURCE * * * SAMPLE SOURCE MINE DRAINAGE
 DRAINAGE BASIN PD LAND SURFACE ALTITUDE
 AGENCY + SAMPLER USFS*AEER SUSTAINED YIELD
 BOTTLE NUMBER D7-8802 YIELD MEAS METHOD
 DATE SAMPLED 03-MAY-88 TOTAL DEPTH OF WELL
 TIME SAMPLED 14:00 HOURS SWL ABOVE(-) OR BELOW GS
 LAB + ANALYST MBMG*WJO CASING DIAMETER
 DATE ANALYZED 01-JUN-88 CASING TYPE
 SAMPLE HANDLING COMPLETION TYPE *
 METHOD SAMPLED PERFORATED INTERVAL
 WATER USE RECREATIONAL

SAMPLING SITE
 GEOLOGIC SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	25.3	1.26	BICARBONATE (HCO3)	161.0	2.64
MAGNESIUM (MG)	15.1	1.24	CARBONATE (CO3)	0.	
SODIUM (NA)	9.6	.42	CHLORIDE (CL)	.7	.02
POTASSIUM (K)	1.4	.04	SULFATE (SO4)	16.9	.35
IRON (FE)	.19	.01	NITRATE (AS N)	.04	.00
MANGANESE (MN)	.33	.01	FLUORIDE (F)	.1	.01
SILICA (SiO2)	11.2		PHOSPHATE TOT (AS P)		

TOTAL CATIONS 2.99 TOTAL ANIONS 3.01

STANDARD DEVIATION OF ANION-CATION BALANCE (SIGMA) .165

CALCULATED DISSOLVED SOLIDS	160.17	TOTAL HARDNESS AS CaCO3	125.32
SUM OF DISS. CONSTITUENT	241.86	FIELD HARDNESS AS CaCO3	
FIELD CONDUCTIVITY, MICROMHOS		TOTAL ALKALINITY AS CaCO3	132.04
LAB CONDUCTIVITY, MICROMHOS	302.6	FIELD ALKALINITY AS CaCO3	
FIELD PH		RYZNAR STABILITY INDEX	9.01
LABORATORY PH	6.84	LANGLIER ADSORPTION INDEX	-1.08
ADJUSTED SODIUM AD. RATIO		SODIUM ADSORPTION RATIO	.37

PARAMETER	VALUE	PARAMETER	VALUE
ALUMINUM, DISS (UG/L AS AL)	<2.	NICKEL, DISS (UG/L AS NI)	<10.
SILVER, DISS (UG/L AS AG)	<2.	PHOSPHATE, TO, DIS (MG/L-P)	<.1
BORON, DISS (UG/L AS B)	<20.	STRONTIUM, DISS (UG/L AS SR)	410.
CADMIUM, DISS (UG/L AS CD)	<2.	TITANIUM, DISS (UG/L AS TI)	<1.
CHROMIUM, DISS (UG/L AS CR)	<2.	VANADIUM, DISS (UG/L AS V)	1.
COPPER, DISS (UG/L AS CU)	<2.	ZINC, DISS (UG/L AS ZN)	11.
LITHIUM, DISS (UG/L AS LI)	17.	ZIRCONIUM, DISS (UG/L AS ZR)	<4.
MOLYBDENUM, DISS (UG/L AS MO)	<20.	O-PHOSPHATE, DISS (MG/L-P)	<.1
BROMIDE, DISS (MG/L AS BR)	<.1	ARSENIC, DISS (UG/L AS AS)	<.1
LEAD, DISS (UG/L AS PB)	<40.	LEAD, BIO. (UG/L AS PB)	<40.
ARSENIC, BIO. (UG/L AS AS)	<.1	MERCURY, DISS (UG/L AS HG)	<.04
MERCURY, BIO. (UG/L AS HG)	<.04		

REMARKS: ABANDONED INACTIVE MINE PORTAL * EXTENSIVE RED STAIN WHERE SEEPAGE SURFACES *

EXPLANATION: MG/L = MILLIGRAMS PER LITER, UG/L = MICROGRAMS PER LITER, MEQ/L = MILLIEQUIVALENTS PER LITER, FT = FEET, MT = METERS, (M) = MEASURED, (E) = ESTIMATED, (R) = REPORTED, TR = TOTAL RECOVERABLE, TOT = TOTAL, BIO = BIOLOGICALLY AVAILABLE, SIGMA INCLUDES AL, CU, SR, ZN, AND H+ IF REPORTED.

OTHER AVAILABLE DATA QW NA S2 WI QW FW AT OTHER
 OTHER FILE NUMBERS:

LAST EDIT DATE: 02-JUN-88 BY: TP *RCS
 PROCESSING PROGRAM: F1730P V4 (12/19/86) PRINTED: 16-JUN-88

PERCENT MEQ/L (FOR PIPER PLOT)
 CA MG NA K CL SO4 HCO3 CO3
 22.5 41.9 14.1 1.2 .7 11.7 87.9 .0

NOTE: IN CORRESPONDENCE, PLEASE REFER TO LAB NUMBER: 88Q0305



45-017 #15: Open pit; AD-1 sample location



45-017 #16: WR-1 from west and above



45-017 #17: WR-1 from east on trail

